

October • 1951

Finish

Metal Products Manufacturing

FROM RAW METAL TO FINISHED PRODUCT

**WASHROOM WALLS IN
PITTSBURGH'S NEWEST SKYSCRAPER
ARE PORCELAIN ENAMEL ON STEEL . . .**

**IN
"Ceramic"
COLORS**



The men's washrooms (see upper picture) are paneled in "Ceramic" Ivory Porcelain Enamel.

Immediately above is shown one of the women's washrooms, which are paneled in Porcelain Enamel, "Ceramic" Greyed Rose.

Carrying out the theme of trim efficiency evident throughout this most modern office building, the washroom walls of 525 William Penn Place Building are paneled in durable, sanitary, attractive Porcelain Enamel. The enameling was done by Ingram-Richardson Mfg. Co. on U. S. S. Vitrenamel. The colors were furnished by Ceramic Color and Chemical Mfg. Co., to match the architect's specifications.

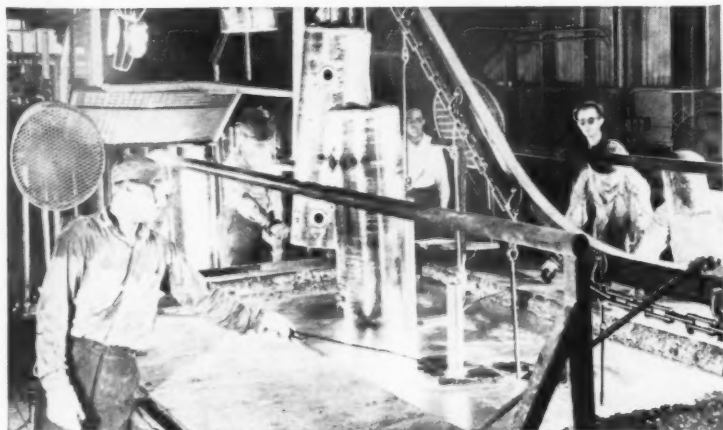
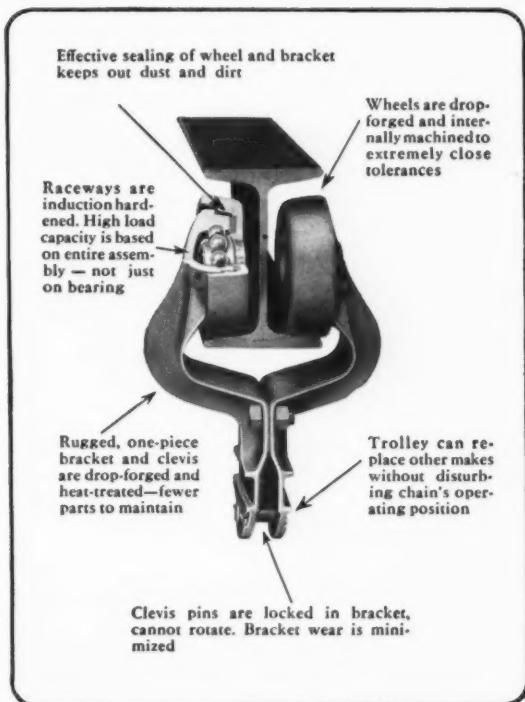


CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.

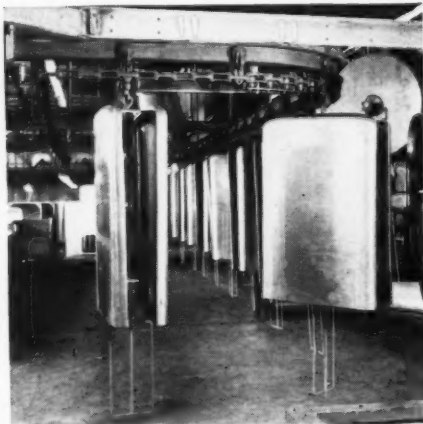
When you buy TROLLEY CONVEYORS . . .

LINK-BELT GIVES YOU BOTH!

**Superior components →
plus engineering ingenuity**



This Link-Belt Overhead Trolley Conveyor, shown carrying Rheem steel water heater tanks out of the kettle, is an integral part of a controlled automatic hot-dip galvanizing process.



Refrigerator doors are carried by a Link-Belt Overhead Trolley Conveyor from alongside the presses in steel shop through finishing.

Travel up, down and around at synchronized speeds. Straight-line production regardless of physical layout. Saving of floor space. Release of manpower for productive jobs.

You get all these outstanding production advantages with any well-engineered overhead trolley conveyor. But you get more—much more—when you specify Link-Belt.

Not only does Link-Belt make the most popular, the most advanced trolley on the market—you also tap industry's greatest source of materials handling and power transmission experience.

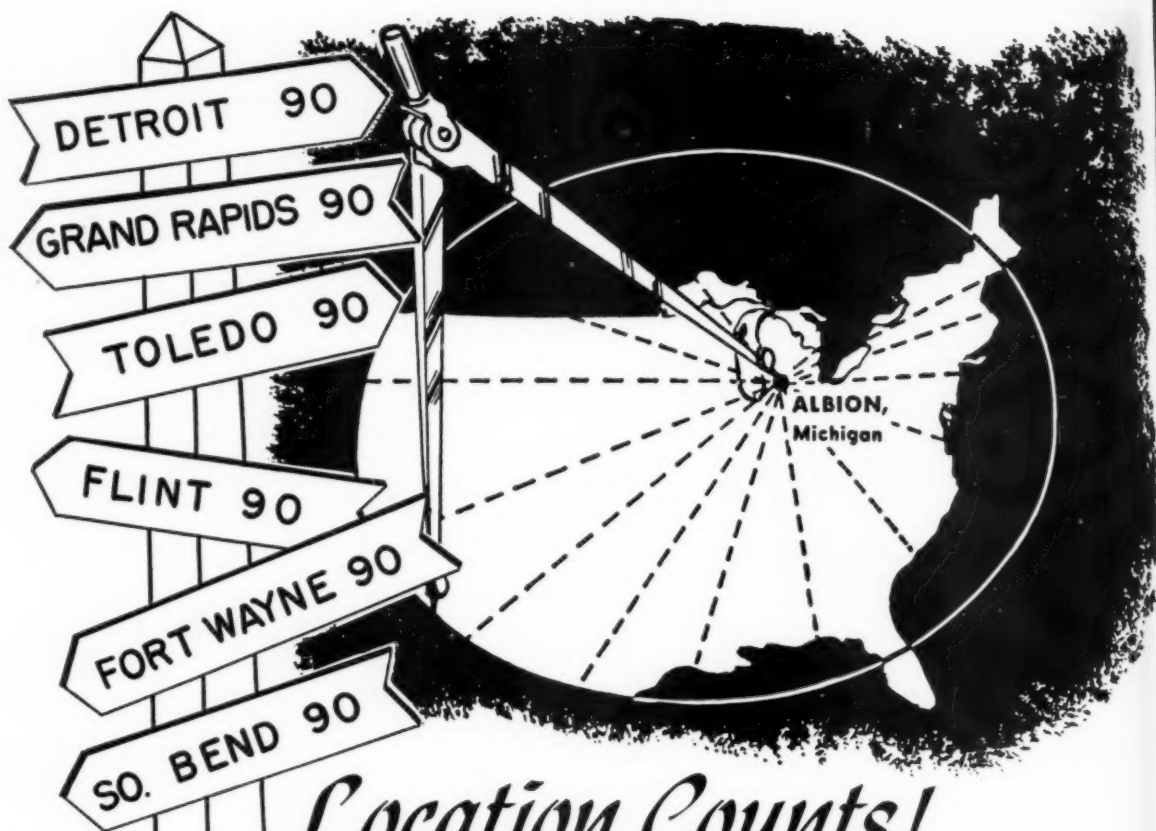
Put quality manufacture plus engineering ingenuity to work for you. Our specialists will work with you and your consultants . . . help you set up smooth, steady, straight-line production in your plant.

LINK-BELT

OVERHEAD TROLLEY CONVEYORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

12,345-8



Location Counts!

The location of your contract supplier is mighty important to you for "ON TIME" delivery at the lowest transportation cost.

That's why UNION STEEL'S non-strategic area, centralized location makes it your ideal supply source for your welded wire assemblies, sheet metal parts, heavy equipment and other items which can be produced most economically by USP's specialized manufacturing operations. Major railroads, fast trucking facilities, air and nearby low cost water transportation are available at Albion's doorstep.

Let USP engineers and designers help you with your regular and defense product problems. Enjoy the high-quality "ON TIME", low cost delivery of UNION STEEL-built products.



UNION STEEL PRODUCTS COMPANY

WIRE PRODUCTS DIVISION • ALBION, MICHIGAN

Here's ready-made experience for you--

MACCO...

DEFENSE PRODUCTION KNOW HOW

**...will help you
solve D.O. problems
in a hurry**



Defense Orders present multiple problems. In addition, meeting government requirements can be complicated and perplexing. In such cases--there's no substitute for on-the-job-experience gained during the last emergency.

When it comes to drawing, cutting and preparing all types of metals for finishing into aircraft parts, tank parts, guns, gun carriages, shells, cartridge cases, and other ordnance products--Macco has the highly specialized know-how...plus...the necessary products for performing each operation, step by step.

That invaluable ready-made experience is available to you at no cost. The engineers who acquired it will be glad to help you solve your defense production problems in a hurry.

HERE ARE A FEW OF THE OPERATIONS WHERE MACCO GOT ITS KNOW HOW

<i>Jobs</i>	<i>Operations</i>
Shells, projectiles, rockets--all sizes	Machining, rust-proofing, painting
Cartridge cases--from 50 cal. to 155mm, both steel and brass	Drawing
Tank tread connectors	Machining
Blitz cans	Drawing, cleaning, and phosphatising
Screw machine products	Machining
Jet engine parts	Forging and drawing
Bazooka shells	Machining
Fuses	Machining, cleaning, and plating
Tank parts--transmissions, axles, differentials	Machining, piercing, punching, shearing

525 W. 76th Street, Chicago 20, Ill.

Chemical Compounds for the Metal Working Trade--Since 1931

MACCO
PRODUCTS COMPANY

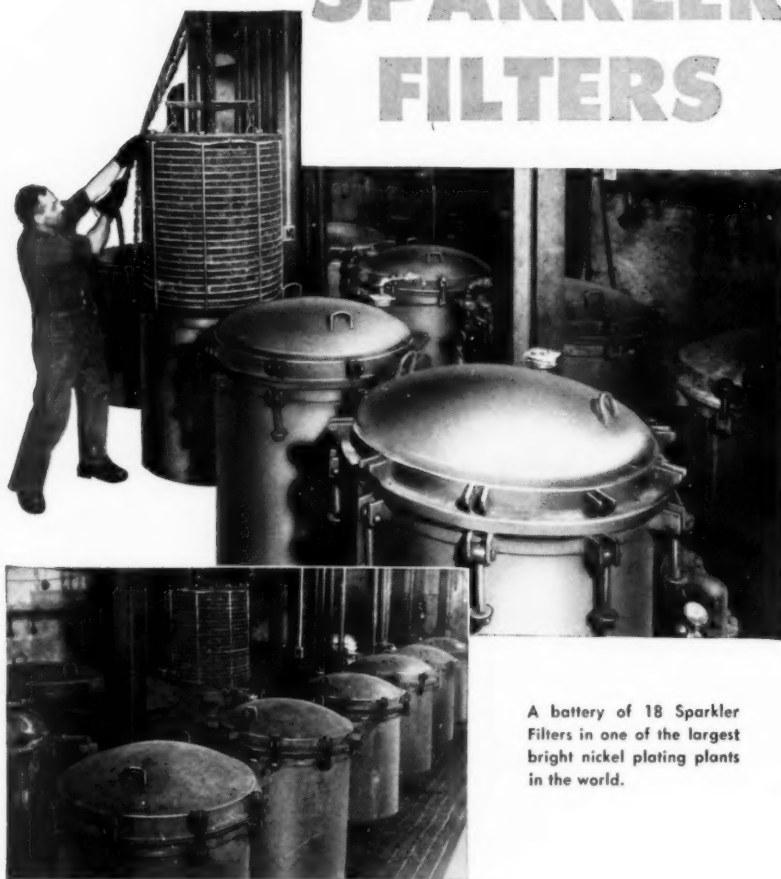
Phone--Aberdeen 4-3200-1-2-3-4

NO SHUT DOWN

To Carbon Treat Solution

with

SPARKLER FILTERS



A battery of 18 Sparkler Filters in one of the largest bright nickel plating plants in the world.

Carbon treatment without shut down is accomplished by cutting out one or two units in a battery of filters, removing the cartridge assembly of filter plates, and replacing with a new plate cartridge dressed with clean filter paper. The proper amount of carbon is mixed with water in a standby tank and recirculated through the filter thus depositing the carbon on the new plates in a cake of uniform thickness and density. The solution requiring a carbon treatment is then circulated through the carbon beds giving the plating solution the carbon treatment without contaminating the tank or stopping plating operations.

The quick change feature of the plate cartridge in Sparkler filters permits replacing a set of plates in a matter of minutes. Production can be resumed without appreciable interruption.

Sparkler Horizontal Plate Filters give absolutely sharp filtration at all stages of the cycle.

SPARKLER MANUFACTURING CO.

Mundelein, Illinois

European Plant — Herengracht 568, Amsterdam, Holland



MEETINGS

INDUSTRIAL PACKAGING SHOW

The 6th annual Industrial Packaging and Materials Handling Exposition will be held in Cleveland's Public Auditorium, October 1-4. Concurrent with the show will be the Packaging and Materials Handling Short Courses.

METAL STAMPERS MEETING

The annual meeting of the Pressed Metal Institute will be held in Chicago at the Drake Hotel, October 3, 4 and 5.

ENAMELERS SHOP FORUM

The annual shop practices forum of the Porcelain Enamel Institute will be held this year at Ohio State University, Columbus, Ohio, October 10, 11 and 12.

WORLD METALLURGICAL

CONGRESS

The first international World Metallurgical Congress will be held in Detroit, October 14-19. It will be held in conjunction with the 33rd annual National Metal Congress and concurrent National Metal Exposition.

AGA CONVENTION IN ST. LOUIS

The 33rd annual convention of the American Gas Association will be held in St. Louis, Missouri, October 15, 16 and 17.

PAINT INDUSTRIES MEETINGS

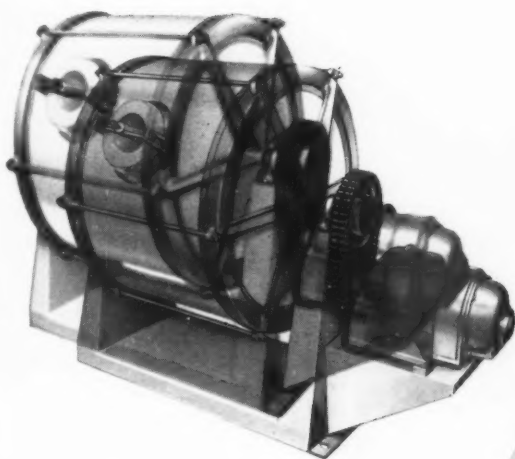
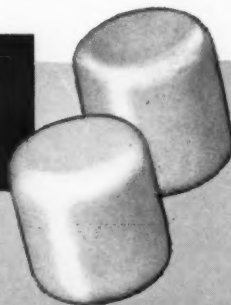
The annual convention of the National Paint, Varnish and Lacquer Association will be held in Atlantic City, October 29-31, and immediately following will be the annual convention of the Federation of Paint and Varnish Production Clubs, November 1-3.

PEI ANNUAL MEETING

The annual meeting of the Porcelain Enamel Institute will be held at The Greenbrier, White Sulphur Springs, W. Va., October 31, November 1 and 2.

YOU'LL SEE DOUBLE WHEN YOU USE

Burundum



It's a fact!! You'll see practically double the production from your mills when you use Burundum, the cylindrical grinding medium.

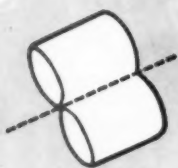
Many paint manufacturers are getting faster, finer grinds through the simple substitution of Burundum for other non-metallic media. One paint maker reports the grinding of a standard chrome green in an alkyd vehicle was accomplished in 23 hours with Burundum as compared to 46 hours for flint pebbles. Another slashed the grinding time of a gray enamel from 80 to 42 hours with Burundum. Still another ground a zinc chromate primer in just under half the usual time by using Burundum. You, too, can make substantial savings in time by switching to Burundum.

The main reasons for the greater grinding efficiency of Burundum are its unique form, high density, and high specific gravity. Combined, they give you faster action, greater attrition, less "floating" and "packing".

You'll also like the tough, impermeable surface of Burundum that makes for long, uniform wear — minimum contamination—easier, faster washing.

Why don't you get more out of your mills, by putting Burundum in?

Burundum's tubular shape means greater grinding contact area. No matter how the media falls contact area is greater than the pinpoint contact characteristic of spherical media.



**WRITE
TODAY**

For Samples, Case Histories,
and Technical Data

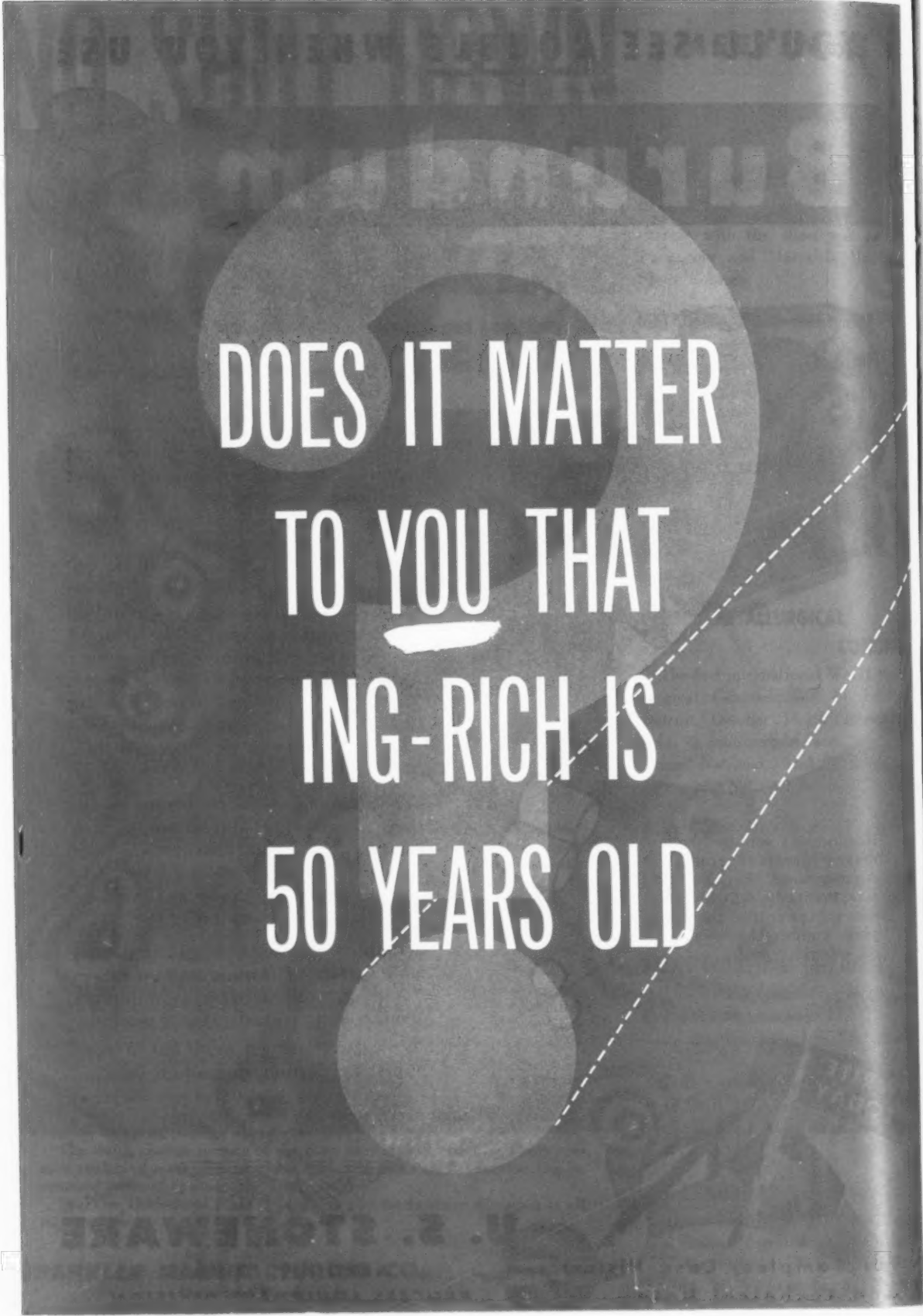
U. S. STONEWARE

AKRON 9, OHIO

PROCESS EQUIPMENT DIVISION

183C

finish OCTOBER • 1951



DOES IT MATTER
TO YOU THAT
ING-RICH IS
50 YEARS OLD

You bet it does!

When they slap *you* on the back on your birthday and say, "Many happy returns!" . . . the most sincere wishes for your continued health come from your life insurance agent.

When a *company* reaches the half-century mark . . . the most heartfelt congratulations come from customers who have profited from that company's experience and progress.

So it *does* matter to you that Ing-Rich is fifty years old this year. If you now buy PORCELFRIT, you have benefited from the pioneering, the research, the striving for excellence, which have marked this company's progressive growth. If you are not an Ing-Rich customer, you still have shared in Ing-Rich improvements, many of which have been adopted by the entire industry. Get ALL these improvements by specifying plant-tested PORCELFRIT . . . the frit with the flaws eliminated right in our own porcelain enameling plant.

Our sincere thanks go to those customers . . . and there are many . . . who have been on our books for year after year, growing with us. And our earnest promise *never* to stop trying to improve PORCELFRIT goes out to all.

INGRAM-RICHARDSON, INC.
OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA

6 GOOD REASONS FOR USING PORCELFRIT



1. FEWER REJECTS—Rejects cut your profits and PORCELFRIT cuts rejects to a minimum.



2. SERVICE ENGINEERING—Our service engineers are available to make sure that PORCELFRIT works right for your product . . . you take no chances.



3. LABORATORY CONTROL—Our ceramic engineers maintain constant contact with the production staff to make sure of highest quality.



4. IMPROVED SMELTING—Ing-Rich uses unquestionably the world's finest smelting method, the result of exhaustive research and experiment.



5. EXPERIENCE—Since 1901 Ing-Rich has pioneered in porcelain enameling. We have learned a lot in that time—and our customers profit by it.



6. PLANT TESTING—Right in our own porcelain enameling plant, under conditions of actual use, we use PORCELFRIT. When you get it, it's right!



INVESTIGATE

The Sensational New

"PAINT MISER"

Before You Install Any
ELECTROSTATIC
PAINT-SPRAY EQUIPMENT

(You'll Be Mighty Glad You Did)



ASHDEE PRODUCTS, INC.

18029 Dixie Highway • Homewood, Illinois


PENNSALT CHEMICALS

METAL CLEANING DIGEST

for men interested in Metal Cleaning Economies

ONE OPERATION LESS . . .

rubber tank lining protected because of a Pennsalt study

A large appliance manufacturer was having trouble in his pre-enameling cleaning department. The removal of drawing compound was the job, and an emulsion type cleaner was the first bath used.

Fumes from this emulsion cleaner were being carried along, and were attacking the rubber pickling tank lining. Clearly something had to be done! A Pennsalt Service Representative went to work.

He studied the composition of the drawing compound being used. He studied the eleven operations following the emulsion cleaner bath. Then he ran a test, which proved that the emulsion cleaner step could be replaced with *correct* hot rinsing. The subsequent spray washing with Pennsalt Cleaner #30 and a three-stage cascade rinse was all that was needed to prepare these steel parts for the pickling tank.

Making Study is the First Step

Making a study like this is the first step taken by a Pennsalt Service Representative when he starts working on a metal cleaning problem. While Pennsalt Metal Cleaners have

demonstrated their superiority time and again, the Pennsalt Service Representative will first study all phases of the problem thoroughly, and then make appropriate recommendations.

Cleaner Cost Cut 50% . . . Manhours Reduced

Recently a manufacturer of metal parts asked a Pennsalt Service Representative if tack wiping manhours, prior to electro-spray painting, could be reduced. The Pennsalt Service Representative got busy.

The problem involved the removal of various stamping oils and drawing compounds. Both spray and soak tank equipment were available.

After a thorough study, a two-minute spray in Pennsalt Cleaner #32 was recommended. This was followed by cold spray fogging and a one-minute soak in another tank of Pennsalt #32. A five-second cold spray rinse followed, and then a 45-second cold soak rinse. Another five-second cold spray rinse completed the job.

Tack Wiping Eliminated

This manufacturer had originally asked the Pennsalt Service Represent-

ative to *reduce* the manhours spent tack wiping. Successive tests proved conclusively that the Pennsalt cleaning method went considerably farther . . . it completely *eliminated* tack wiping, and in addition it reduced manhour cost in painting operations considerably. The actual cost of the cleaner used was also cut 50% . . . one more example of how a thorough study can cut costs, boost production.

For Your Lab Notebook

Why Pennsalt Alkaline Cleaners are Based on Fused Materials

Pennsalt alkalies for metal cleaners are prepared by an economical patented process that produces a fused homogeneous material. Fused alkalies will not segregate in drums—the alkali on the top of the drum is of the same balanced composition as the alkali at the bottom of the drum. Homogeneous composition also means fast, even dissolving of the alkali crystals—no rapid solution of caustic agents while phosphates or silicates drop to the tank bottom and dissolve slowly.

These fused alkalies are used as base materials for the various Pennsalt metal cleaners. Thus the user is assured of minimum alkali segregation, along with efficient, balanced bath composition. Pennsalt is a basic producer of metal cleaning alkalies—this means economies in manufacture which are passed on to the user. Use the coupon for more information or help on your cleaning problems from experienced Pennsalt fieldmen.



**PENNSALT
CHEMICALS**

for Industry • Agriculture • Health • Home

PENNSYLVANIA SALT MANUFACTURING CO.
WIDENER BUILDING • PHILADELPHIA 7, PA.
Progressive Chemistry for over a Century

MAIL THIS COUPON

Please send more information on cleaning

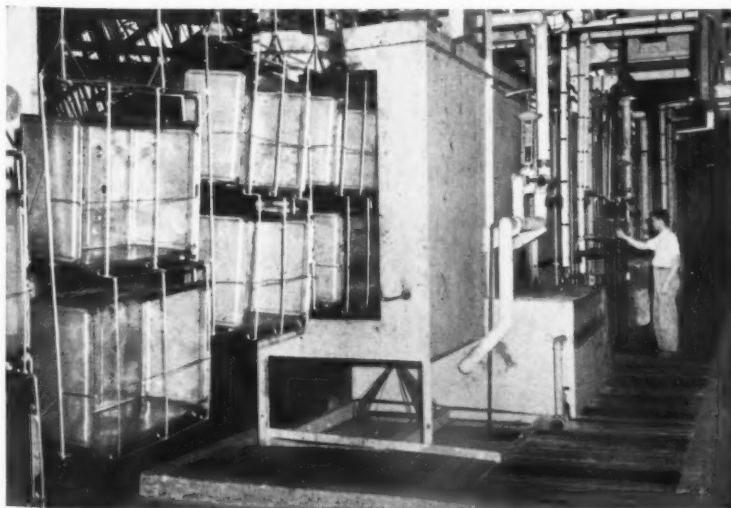
.....
(metal)
prior to
(finishing method) (D)

Name.....

Company.....

Address.....

City.....Zone.....State.....



In this modern plant, the enameling layout was especially designed to incorporate the latest equipment, including an overhead conveyor-type spray washing machine. Pennsalt Cleaners are used exclusively in this streamlined operation.

Facts you should know about VITRO

42 YEARS EXPERIENCE AS CERAMIC COLOR SPECIALISTS

Back of every Vitro product is the experience and "know-how" gained by us as ceramic color specialists for 42 years.

1909



1951

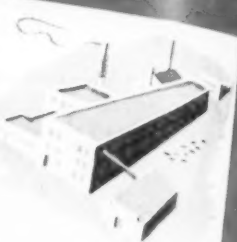
ENLARGED, MODERNIZED RESEARCH LABORATORY

Vitro's up-to-date research laboratory and experienced technologists and chemists are at your service for any color problem you might have.



MODERN EXPANDED PHYSICAL PLANT

In the past few years new plant facilities have been added and old construction modernized, resulting in an increase of 3 3/4% in floor space.



EFFICIENT REFERENCE SAMPLE LIBRARY

An actual sample of every color formulated by Vitro is carefully filed for reference in re-ordering and color matching.



NEW, INCREASED PRODUCTION FACILITIES

Vitro's greatly expanded manufacturing facilities include the newest, most efficient equipment available for the production of ceramic colors and glaze frits.



..all add up to Better, More Complete Color Service for you!

Colors by
VITRO

To meet your enamel requirements,

VITRO OFFERS:

- Color oxides • Colors for printing, graining, stamping • Screening colors • Specialty chemicals.

In view of present or possible future shortages of certain materials, our primary aim is to continue to better serve the needs of the vitreous porcelain enamel industry. In this connection, where certain colors are restricted, we have developed substitutes that have been found very acceptable.



THE VITRO MANUFACTURING CO. CORLISS STATION • PITTSBURGH 4, PA.

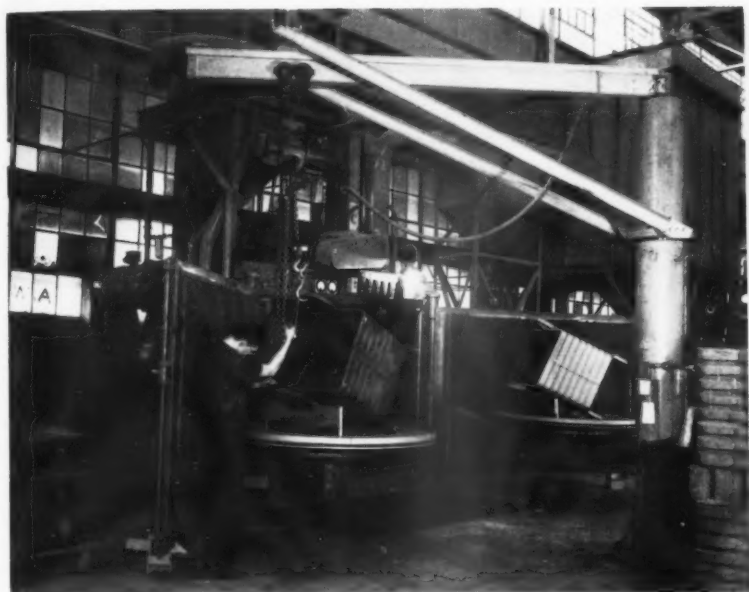
Sales Representatives: Pittsburgh • Chicago • New York • San Francisco • Toronto

Southern California Agents: Westwood Ceramic Supply Co., Los Angeles, California



finish SUGGESTION BOX

**Usable life of tote boxes increased
by airless abrasive cleaning**



TO increase the usable life of its tote boxes, Caterpillar Tractor Company, Peoria, Illinois, has begun a program for reconditioning them. The complete set of equipment for the reconditioning process is not ready yet, but some cleaning, rinsing, and painting operations are now being carried on. Chipped paint and accumulated rust are removed from the boxes in an airless blast cabinet designed for continual cleaning. Each box requires 2 minutes of blasting time.

The front of this cabinet has two doors, either of which can completely close the cabinet. A 66" rotating work table is mounted on each door. As a door is closed, the table moves into the blasting zone; when the door is opened, the table comes out for loading. An operator can maintain a continual cleaning schedule be-

cause while one table load is under the blast, he can load the other table and have it ready for blasting when the first one comes out.

A fixture has been placed on each table for holding the boxes so that all surfaces are completely covered by the abrasive thrown from two rotating wheels. Each box is blasted in two positions, with one minute's time required in each position. Caterpillar has approximately 137,000 tote boxes which it intends to put through the reconditioning program. Each box will go through reconditioning every 2½ years, and it is expected that the normal life of the boxes will be doubled.

Source for further information on this airless abrasive cleaning operation may be obtained by writing directly to finish.

AGA ANNUAL CONVENTION

IN ST. LOUIS, OCTOBER 15-17

The 33rd annual convention of the American Gas Association will be held in St. Louis, October 15-17.

All meetings, except those otherwise noted in the convention program, will be held in the Kiel Auditorium, located within a short distance of downtown hotels.

The first general session, Monday morning, October 15, will feature an address on "Six Months in the Petroleum Administration for Defense," by C. Pratt Rather, Deputy Administrator (Gas), Petroleum Administration for Defense. Mr. Rather will be preceded by Edward F. Barrett, AGA treasurer, who will give the treasurer's report, and D. A. Hulcy, AGA president, who will present the president's annual address.

The second general session, Tuesday, will feature the following: "A Dependable Supply of Fuel for Industry", by Harry K. Wrench, president, Minneapolis Gas Co.; "Outlook for Housing in 1952", by Frank W. Cortright, executive vice pres., National Association of Home Builders; and "Presentation of Awards."

The third general session, Wednesday, will feature: "There's Nothing Like a Dame", by Clara H. Zillesen, formerly advertising manager, Philadelphia Electric Co.; "Election of Officers"; "Speaking of Gas, Strictly Gas", by Frederic O. Hess, president, Gas Appliance Manufacturers Association, and president, Selas Corporation of America; and "Citizen's Responsibility", by Everett M. Dirksen, United States Senator from Illinois.

SECOND QUARTER FIGURES ON

PLUMBING FIXTURE SHIPMENTS

Manufacturers' shipments of porcelain enameled steel plumbing fixtures during the second quarter of 1951 were approximately 11% higher than during the same period in 1950, according to the Porcelain Enamel Institute. Second quarter shipments were valued at \$15.2 million, about \$1.7 more than in 1950, but \$3.5 million less than shipments during the first quarter of this year.

Laboratory-Tested

APEC
frits

MINIMIZE PRODUCTION HEADACHES

Abreast of Today's Problems . . . through Service

APEC field engineers are constantly on the job serving industry in a thorough and competent manner. We are always ready to meet our responsibility to customers with complete on-the-spot service.

The APEC field organization keep abreast of today's problems — through service.

APEC SERVICE

"always on the job"

**Abreast of Future Problems
. . . through Research**

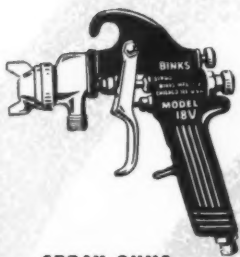
APEC research engineers are constantly looking to the future. Better methods and superior products continue to unfold in the modern laboratories at APEC. You can depend on APEC to keep abreast of future problems . . . through continuous research.

"DEPEND ON APEC"



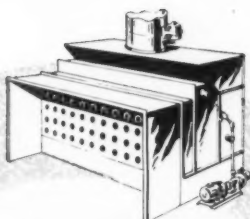
American PORCELAIN ENAMEL COMPANY

1285 E. KEATING AVENUE • MUSKEGON, MICHIGAN 2-8808



SPRAY GUNS

specially designed for ceramic finishing



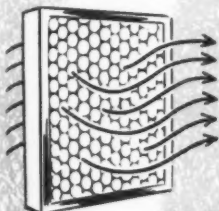
DYNAPRECIPITOR WATER-WASH CERAMIC SPRAY BOOTHS

remove over-spray; reclaim frit



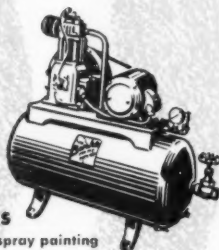
OIL AND WATER EXTRACTORS

7 models supplying clean, dry air



AIR SUPPLY SYSTEMS

filtered, dust-free air



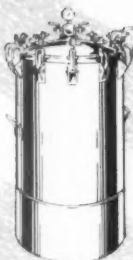
AIR COMPRESSORS

24 models especially for spray painting



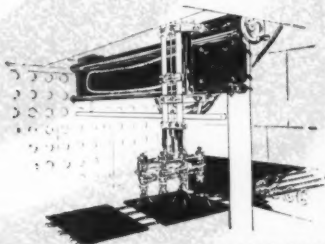
HOSE AND ACCESSORIES

12 types of hose,
full line of accessories



MATERIAL TANKS

corrosion-proof construction



AUTOMATIC FINISHING EQUIPMENT

for lower production costs

Binks has **everything** you need for

BETTER CERAMIC FINISHING

Wherever fine ceramic finishes are applied, you will find Binks precision-made spray finishing equipment...and for good reasons:

Lower costs. Binks equipment reduces rejects... gives you faster finishing. Tungsten-carbide insets at points of wear add greatly to the life of Binks Ceramic guns.

Finer finishes. Binks spray guns are precision-made to apply smooth, uniform finishes.

Everything from a single source from spray guns to complete finishing departments...for both ceramic and organic finishes.

Standardization. Binks equipment gives you increased flexibility because parts are interchangeable...all threads are standard.

Nationwide service. Whether you want replacement parts or repair in a rush, or expert counsel on lower cost methods of finishing, Binks is your finishing center.

"Repeat orders for Binks equipment are our best indication of performance."

Burke B. Bode
President

Send now for full information
on the Binks line of finishing equipment.



Binks

MANUFACTURING COMPANY

3122-40 Carroll Avenue, Chicago 12, Ill.

NEW YORK • DETROIT • LOS ANGELES • ATLANTA • BOSTON • CLEVELAND • DALLAS • MILWAUKEE • NASHVILLE
PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • WINDSOR, ONTARIO, CANADA

SPRA-LUBE

Lubricates the Overspray

. . . each particle of paint is coated with a non-volatile solvent. And as it hits the water curtain, it can't stick to the back panel or any of the eliminators . . . The booth keeps clean and the sludge remains floating for easy skimming . . . The use of "SPRA-LUBE" guarantees lowest material and maintenance costs. Let our technicians consult you on this or any of your other cleaning problems — there are thirty-five specialized NORTHWEST products in this field alone. . . .



NORTHWEST CHEMICAL CO.
9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control — serving you since '32

report from the home-front:

THIN-COAT

Titania enamels have

GREATER

abrasion-resistance



*A*n unexpected bonus has rewarded the many formulators who pioneered titania enamels. The question about how well a thinner coat titania enamel would resist abrasion is answered. Reports from the kitchen front during the past several years indicate that thin-coat titania enamels have even greater abrasion-resistance than thick enamels.

And today, with TITANOX-TG available, single-coat enamel formulators are assured of even better results. This non-pigmentary titanium dioxide is specially processed for ceramic use. It yields greater opacity, assures unvarying color uniformity, faster and more economical production. TITANOX-TG is the logical basis for all titania enamel formulations.

Our Technical Service Department is always ready to help you with your individual problems. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments, Limited, Montreal 2; Toronto 1.


[®]
TITANOX

the brightest name in ceramics

**TITANIUM PIGMENT
CORPORATION**

Subsidiary of NATIONAL LEAD COMPANY





*"Those blanks aren't scrap...
they're saleable steel", agreed Norm*

Waste is something Norm can't stand. The same goes for Tom Brinker, manufacturer of portable welding units and a long-time Inland customer. "Every time you form a lamination for your welder," Norm observed, "you leave a 4 x 7 inch piece of 22 gauge electrical sheet steel that you can't use. Why not let us find you a customer for those blanks?"

Norman Grant is an Inland Steel sales representative. His experience told him that those 4" x 7" blanks had more than scrap value. Especially at a time when steel is in such great demand. With his trade contacts, Norm was sure he could find a buyer.

A few days later, on his way to visit another Inland customer, Norm had almost driven past the plant of an outboard motor manufacturer when he got a flash . . . "motors!" He stopped. Sure enough, that manufacturer had a pressing need for steel for his magnetos . . . and 4" x 7" was a perfect size.

Result: An Inland customer's profit was augmented by the sale of otherwise waste blanks and a motor manufacturer got steel he sorely needed. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

**Your scrap is needed by the steel
industry for national defense.**

Names used are fictitious.

**Making your
steel is only part
of our job.**



ROBERT BEANE

Editor's Note:

To refer to the fabricating section of Maytag's Plant 2 as "extensive" would be over-conservatism. Here rows of presses—large, medium and small—"gobble" up nearly 300,000 pounds of steel daily, and for parts of comparatively small overall square footage. The end product is the well-known Maytag automatic washer designed to occupy an important spot in milady's kitchen or laundry.



Fabrication at Maytag

slitting, metal preparation, stamping and welding—describing fabrication equipment used to produce automatic washing machines

second in a series

by Robert Beane • SUPERINTENDENT, SHEET METAL FABRICATION, THE MAYTAG COMPANY, PLANT NO. 2, NEWTON, IOWA, AS TOLD TO Matt Heurly

All flat sheets are handled in strapped bundles by a 14,000 lb. crane for transfer to the steel storage space. The storage area adjoins the track and the maximum distance from box car to storage is only 30 feet.

A 48" capacity steel slitter is used to slit coils or sheet to size. From storage to shear area the sheets are handled by crane and steel grab.

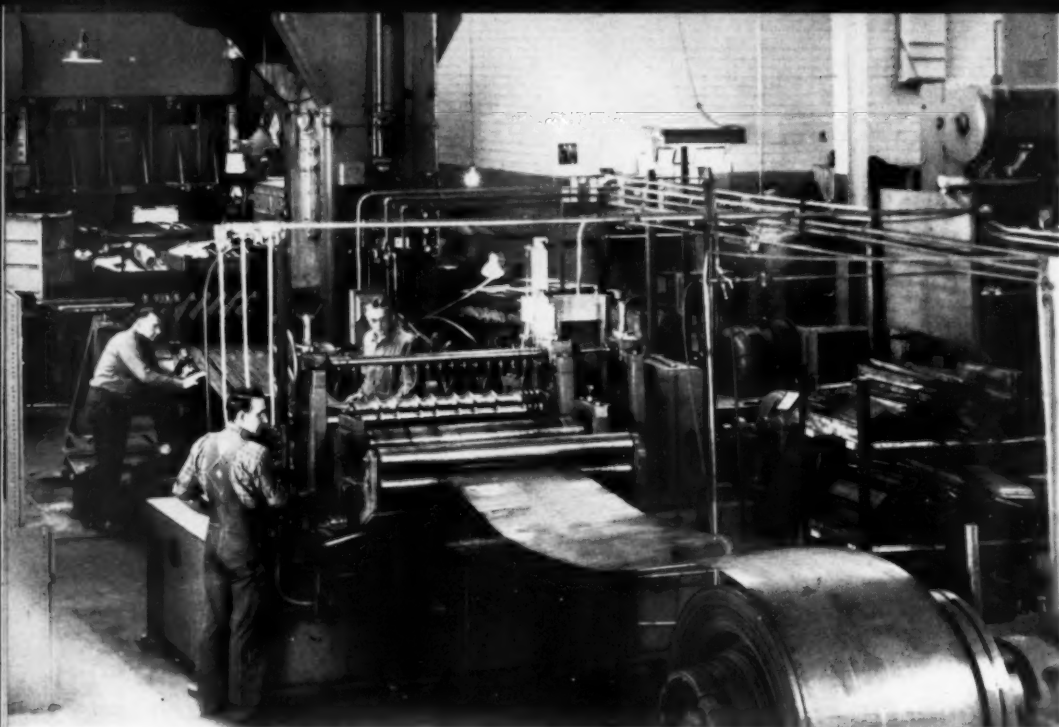
Coils are handled by crane and coil hook to slitter car.

Preparing steel blanks for deep drawing operations

Prior to fabrication, steel blanks are carried through a completely automatic unit which applies a dry drawing compound to facilitate deep drawing operations. The unit is de-

Exclusive feature
finish

Flat sheets and coil steel used in the production of the Maytag automatic washer are unloaded under roof on the receiving side of the model Plant 2 (inside receiving accommodates 13 railroad cars and five trailer trucks).



Left: Coil stock up to 48" wide and $\frac{1}{8}$ " thick is cut on this rotary slitter. A total of twelve cuts can be made from 48" coil stock.

signed to clean, rinse, apply compound, and dry the blanks.

Blanks are first loaded on racks at a station near the stamping area, and the racks are wheeled to a continuous conveyor which takes the ware up into the first booth of the unit. Booth doors automatically close, and the ware is sprayed with a cleaner.

Following, the booth doors drop, and the conveyor takes the ware into a hot spray rinse booth which also has automatically closing doors.

Next, the ware enters the booth

containing a tank of dry drawing compound. Here, after the booth doors close, the tank automatically rises to envelop the ware in the drawing compound.

The final operation is drying the ware in a fourth booth which is a steam convection drying oven. At the exit end, the conveyor returns to floor level and the ware is unloaded.

Cabinet fabrication

Steel is purchased to approximate size for the exterior, or cabinet, with

about $\frac{1}{2}$ " trim stock on two sides.

Blank and trim is accomplished on a 350-ton press providing a blank $100\frac{3}{4}$ " long by $34\frac{5}{8}$ " wide.

The second operation forms a flange and a hem on a 190-ton brake.

Third press operation utilizes a 350-ton hydraulic, netting two operations with each stroke: first forms back corners, the second forms 98" radius for front of cabinet.

A spot welder then tacks the back seam, followed by an automatic seam welder to complete the seam and the



Left: Showing steel blanks leaving special four-stage automatic unit which prepares the metal for fabrication.

Right: Portion of press area where deep drawing, punching and trimming operations are performed. Presses range in capacity from 30-ton mechanicals to 400-ton hydraulics.



wrap-around body.

A rectangular top is spot-gun welded to the body and the cabinet fabrication is completed except for the final metal finishing (with air operated tools) prior to hanging on the service conveyor feeding the organic finishing department.

Fabricating the outer tub

The tub basin or outer tub is fabricated in two sections, "tub upper" and "tub lower."

The "lower" bottom is drawn on

a 300-ton mechanical press. In a second operation it is drawn to size (25" diameter) on a 300-ton double-action hydraulic. A 250-ton mechanical is then used to trim to overall dimensions. Blanking and finish forming the bottom is then accomplished on a 200-ton mechanical.

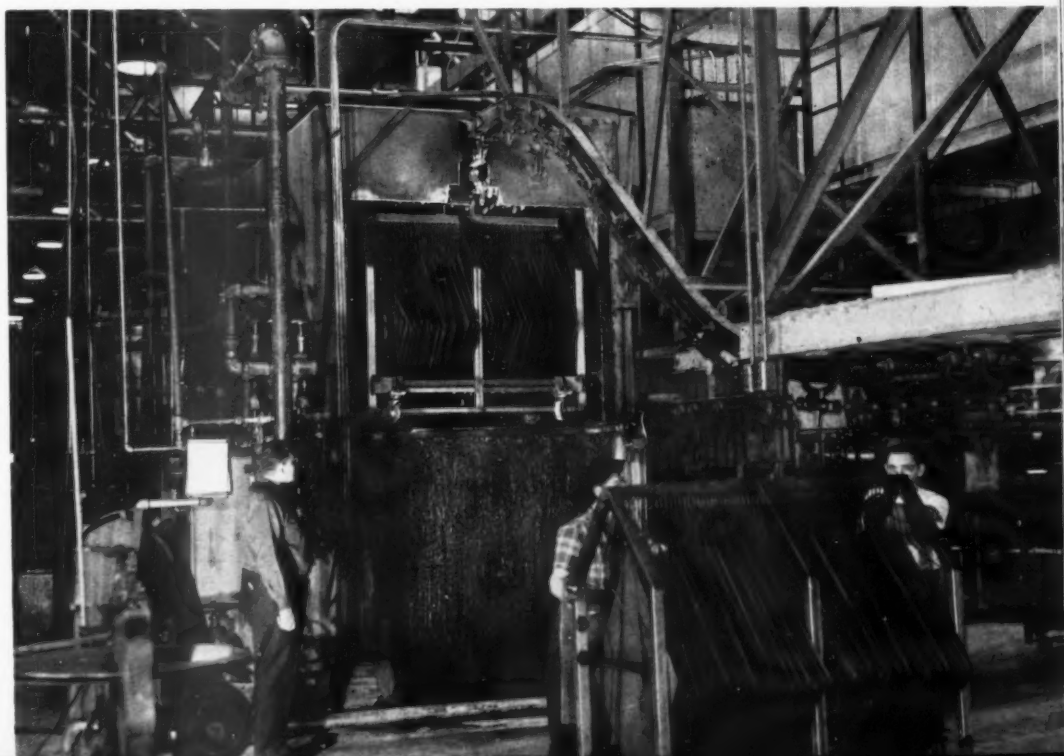
The tub "upper" is first drawn to 14" on a 350-ton hydraulic. Second operation is blank and trim to overall height on a 250-ton mechanical. Third operation forms the top radius on a 200-ton mechanical.

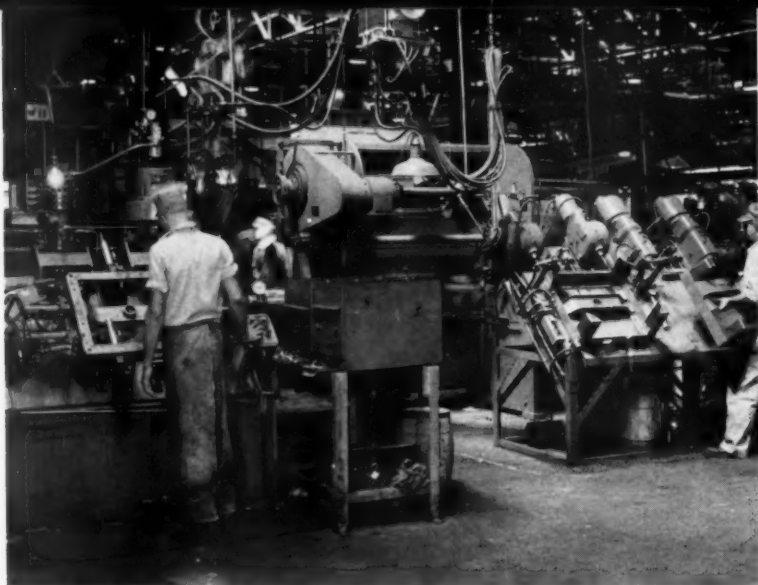
The two parts are delivered to mezzanine storage by conveyor where a bank of 3000 parts is maintained.

From storage, the tub parts are delivered to first welding operations where the two parts are set in a jig, mated, and spot-gun welded. Seam welding is then employed to complete a single unit. Component parts are then projection and spot-welded to the tub assembly.

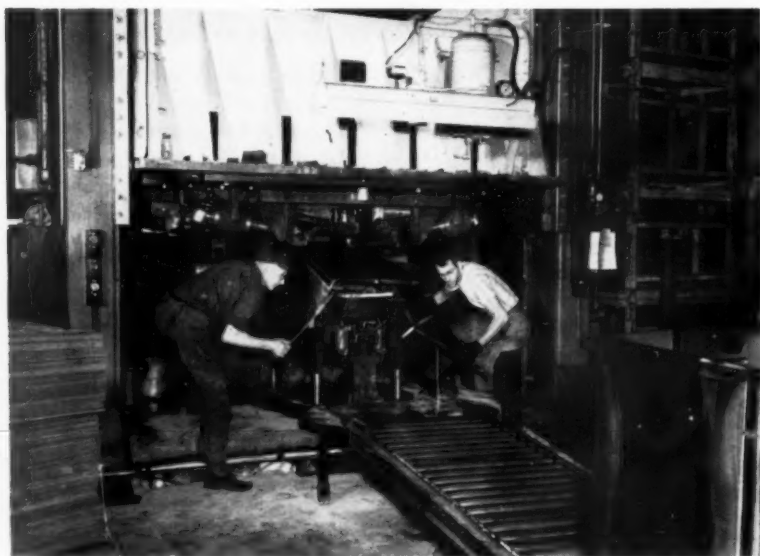
Completed tub units are water-tested for leaks and hung on the service conveyor feeding the plant's

Right: Entrance to the special unit which prepares blanks for stamping. Operations include cleaning, rinsing, application of drawing compound, and drying.



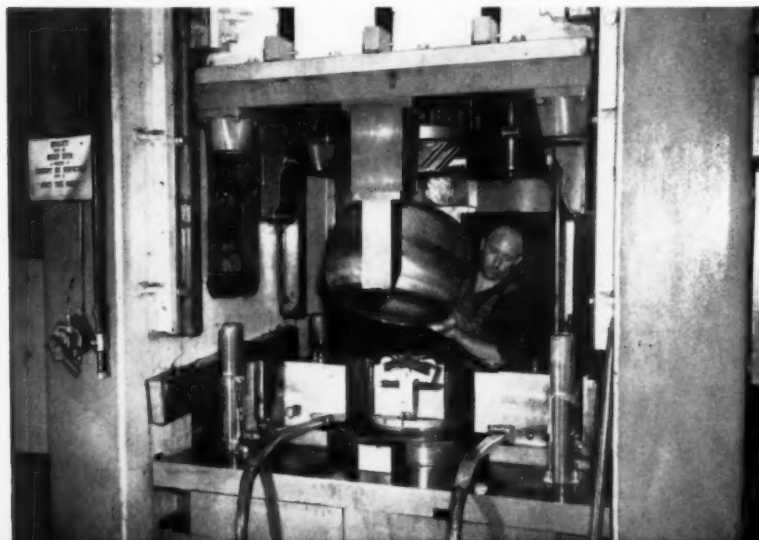


Above: Four types of welding are performed in this area: spot, projection, seam and flash butt. Portable spot welding guns are used extensively.



Above: Workmen are shown removing a cabinet shell after it has been formed in one of the larger presses.

Below: Special die set-up perforates 1000 holes in the inner tube basket with one operation, raises six bosses and pierces six larger holes.



porcelain enameling department.

The spinner tub

The spinner or inner tub "lower" is delivered in circle blanks.

The blank is first drawn to a 7" depth on a 300-ton double-action hydraulic. A second press, a 250-ton mechanical, is used for blank and trim. This is then followed by an interesting die perforating operation in a 200-ton mechanical press. One hundred fifty holes (.135" each) are punched in one operation of the press.

Three thousand of these inner tub "lower" units are held in a piece bank at mezzanine level.

The inner tub "upper" is delivered in square blanks and is blanked and drawn (6½") on a 300-ton hydraulic. Second operation, trim and blank, uses a 250-ton mechanical. A 200-ton mechanical is then used to "finish curl" the top.

Three thousand parts then join the inner tub "lowers" at mezzanine level.

The two parts, "upper" and "lower", feed to an automatic welder in sets where they are placed in a holding jig for mash seam welding.

The inner tub welded assembly then goes to the grinding room where any flash is wire brushed or ground off. A monorail conveyor takes the units through a washer, following which they are delivered to a 350-ton mechanical press for perforating 1000 holes. Perforations are accomplished with an internal cam action die from *inside the tub*. The result is a smooth interior absolutely free of burrs.

The inner tub unit is now complete and is hung on a service conveyor feeding the porcelain enameling department.

The base frame

Blanks for the "base frame" are sheared to length and width for a section which forms one-half of the completed square assembly.

Each half section is processed over a 105-ton brake which performs three separate die operations on the one brake. The operations are (1) notch, (2) form right angle, and (3) form into shape.

The two half-sections then go to a flash butt welder where they are joined to form a complete square base frame.

This square unit then goes to a 300-ton mechanical press, where all service and assembly holes and projections are formed and pierced.

Following the unit to welding, we find that one machine is used to projection-weld four legs to the base frame (upper section) in a single operation.

A second welding machine then spot-welds the four legs to the bottom edge of the unit. A third hydro-matic machine welds all clips and brackets in a single operation.

This completes the fabrication of the "base frame" which is then placed on the conveyor serving the organic finishing department.

The preceding description, as the reader will see, represents only a few of the many fabricating details involved in the production of the Maytag automatic washer—those operations for producing the larger area units. Actually there are 200 stamping operations involving 34 presses. These range from a small 25-ton dieing machine which stamps 200 small washers per minute from stainless steel to the 350-ton hydraulic referred to previously.

Fabrication keyed to finishing

All major component storage is between finishing and assembly. Therefore, practically all fabrication schedules are keyed to production in the organic and ceramic finishing departments. As indicated, the completed fabricated parts are immediately hung on the conveyors servicing these finishing departments.

Parts are designed to use every possible piece of steel advantageously, but as in any fabrication plant there must be some scrap. At Maytag's Plant 2, all steel scrap is delivered to balers located within 15 feet of the car tracks. The scrap is baled into 250-pound bales and loaded direct to open gondola cars.

Engineering features

An interesting engineering feature at Plant 2 is a model plant built to

to Page 67 →



Above: This special unit in the machining department, used for various machining operations on gears, holds pieces to very close tolerances—under .004 according to the indicator reading.



Above: Operator is shown welding the sealed balancing ring which minimizes vibration in the automatic washing machine.

Below: Showing another operation which welds the upper and low tub section together to form the complete outer tub unit.

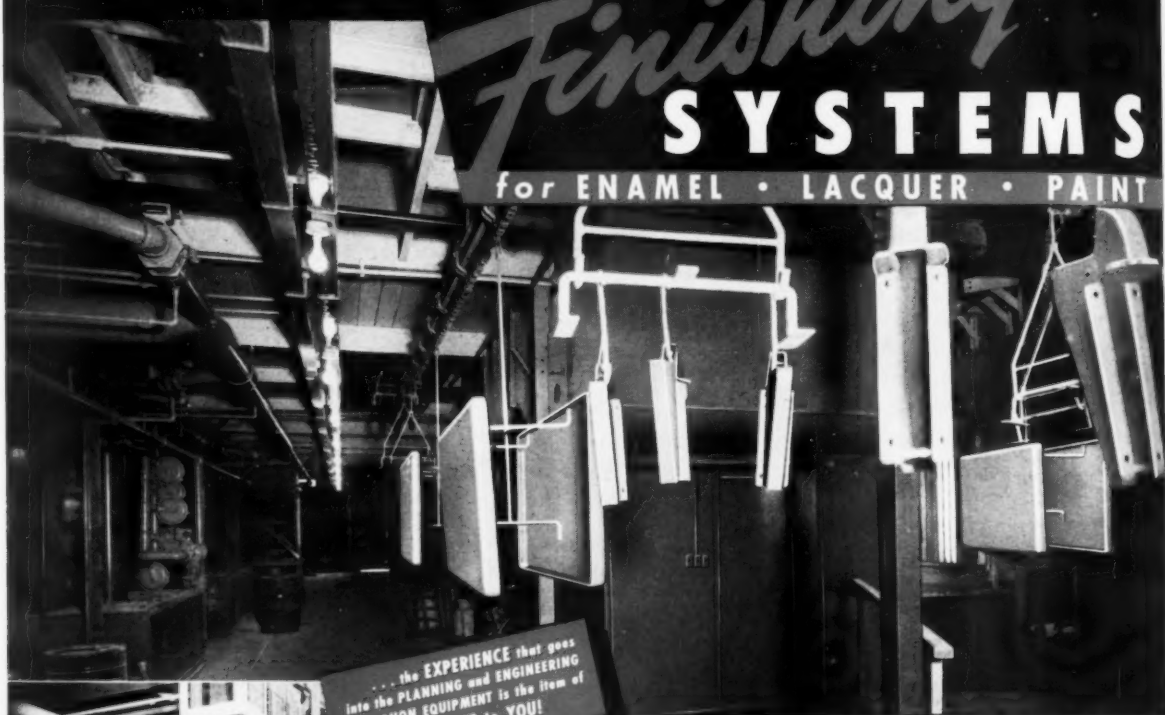


COMPLETE

Finishing

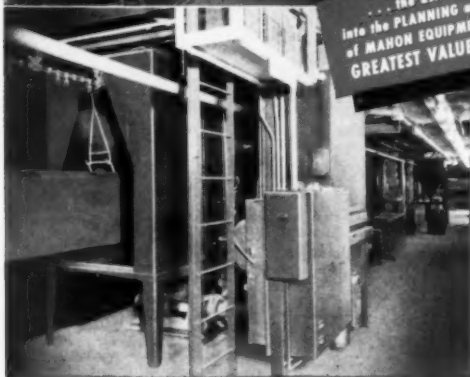
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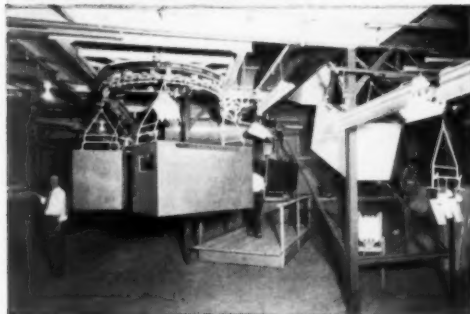


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General View of Complete Mahon Finishing System at Revco Inc., Deerfield, Michigan, Showing Cleaning and Rust Proofing Equipment at Left, Dry-Off and Finish Bake Ovens Above, and Hydro-Filter Spray Booths Right Foreground.



Parts Entering Mahon Five Stage Cleaning and Rust Proofing Machine with "Fire-Jet" Heating Units—Part of Revco System.



Tack Rag Operations Prior to Parts Entering Spray Booths at Revco Inc., Note Parts Emerging from Overhead Finish Bake Oven.

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MAHON

New ceramic coatings for jet engine parts

describing a process for applying a vitreous coating as thin as 0.0005" to alloy metals with resultant longer life or reduction in critical materials used

by Gilbert C. Close • FINISH CORRESPONDENT



Ceramics and metallurgy are at last meeting on common ground. This long needed compatibility between the two sciences is indicated in a recent announcement by Solar Aircraft Company, San Diego, California, of their new "Solaramic" process for applying vitreous coatings on jet engine parts. The announcement was preceded by seven years of intensive, company-sponsored research aimed at developing a ceramic coating material that could be used effectively to increase the heat resistance of the critical alloy parts used in jet engine construction.

Just what the Solaramic process will mean to the enameling industry at large remains to be seen. Right now the process is so critical in national defense work that it has been placed under Secrecy Order by the U. S. Patent Office. Details of frit composition cannot be revealed. It can be definitely stated, however, that the new process, when finally available for civilian use, may logically assist in opening up to the enameling industry an entirely new range of applications.

Special coatings for medium or high alloy materials

The Solaramic process is essentially a porcelain enameling process which makes use of over 200 modifications of a specialized frit to produce vitreous coatings with a wide range of desired characteristics. Smooth or rough, glossy or dull coatings can be produced at will. Variations of the frit can be employed to

coat any of the medium of high alloy materials used in jet engine construction. The material can be applied with uninterrupted continuity over bi-metal junctures such as the numerous weld beads used in engine part fabrication.

Flexibility is an outstanding characteristic of the new coating material. Applied only 0.0005-inch thick, it is used to coat 0.002-inch gauge No. 321 stainless steel sheet which is used to wrap insulating blankets on jet engine blast tubes. This coated

Jet engine liner (left) is fabricated from highly critical alloys containing large amounts of nickel, chromium and other rare metals. The other liner (right) is ordinary No. 321 stainless steel with a ceramic coating. Life expectancy of the coated liner is equal to that of the one made of high alloy materials.

PHOTOS COURTESY SOLAR AIRCRAFT CO.





Two samples of AISI No. 321 stainless steel tested at 1850° F. Sample on left was Solaramic processed and is still in good condition after 150 hours. Sample on right was not coated and was worthless after only 20 hours of exposure.

sheeting has a flexibility comparable to that of mediumly heavy tin foil, and can be bent or wadded in the hand without injury to the ceramic coating.

Three conservation possibilities

The new coating material has three distinct possibilities for conserving the highly critical alloys now used in jet engine construction. First, it can be employed to increase the service life of the critical alloys when operated at the same temperature. Secondly, coated critical alloys can be operated at a higher temperature than uncoated alloys and with equal life expectancy, thereby increasing the efficiency of jet engine operation. Third, and most important in the event of a national emergency, cera-

mic coated non-critical alloys can be used to replace many critical alloy engine parts to operate at the same temperature and with equal service life. Right now it is planned to use many non-critical No. 321 stainless steel parts to replace the high chromium and nickel alloy parts used in the past. Numerous service tests prove that the ceramic coated stainless steel parts have a service life equal to or exceeding the life of the uncoated critical alloy parts.

A single example will sharp-etch the important part that ceramic coating will play in jet engine construction. Engineers discovered that it was necessary to increase the operating temperature of a jet engine combustion chamber component by 100 degrees F. to obtain better en-

gine operating efficiency. This increase of temperature reduced the service life of the critical alloy part from 300 hours to 20 minutes. Subsequently, the part was coated using the ceramic process. The coating restored the 300-hour life cycle of the part when operated at the new higher temperature.

Conventional enameling practice followed

Except for frit composition, the process compares throughout with conventional porcelain enameling practices. The ceramic materials are first mixed, then melted in a furnace. The resulting smelt is then poured in cold water, shattering to form the

Editor's Note:

Deeply interested by the Solar process, the author of this article paid a personal visit to the company's plant and laboratories where he could see at first hand just what is going on. His observations are described in this article.

frit. The frit is then ball milled along with water and binder to produce a slip of the desired consistency.

Parts must be thoroughly cleaned before coating. Acid etching can be used, but sandblasting is preferred in the Solar shops. When pickling is used, an unusual degree of rinsing is necessary to assure non-contamina-



This Lockheed P2V-4 turbo hood is but one example of the ceramic coated low alloy parts that are being used to replace parts made from highly critical alloys.

tion of the final coating. It would seem from this that certain of the frit components are extremely sensitive to acid reaction.

Coating can be accomplished either by dipping or spraying. With dipping, because of the extreme thinness of the coating, hardly any edge head is formed. Solar tooling engineers have designed some complicated spraying nozzles for coating the interior of the highly complex jet engine parts.

Firing at 1650° to 1850° F.

After coating, the parts are oven-dried at normal drying temperature. Burning is accomplished in a conventional furnace at temperatures ranging from 1600 to 1850 degrees F., dependent on the frit modification being employed. The tail cones for jet engines, for instance, are soaked 15 minutes at 1750 degrees F. The coating produced is glossy, smooth, and yellow-green in color.

For normal results only a single coating is used, though multiple coatings have been employed for special purposes.

Solar research engineers list 14 specific advantages of the process when used to coat jet engine parts. Some of these advantages would accrue from conventional porcelain enameling; some would not. Those that would not accrue are what set the process apart from conventional prac-

This sample of 0.002" gauge No. 321 stainless steel sheet has received a ceramic coating only 0.0005" in thickness. Note its evident flexibility and how it may be crumpled without injury to the coating.



tices. They are listed here as a basis for comparison.

1. The coating provides a high degree of protection against oxidation and heat corrosion at high temperatures.

2. The coating permits the use of less critical materials and leaner alloys in many high temperature applications.

3. It has very low heat conductivity and thereby reduces "hot spots" in the underlying metal.

4. Tests prove that the coating definitely reduces cracking and warping of the base metal under high temperature operating conditions.

5. The process allows the making of specific surfaces — smooth or rough, heat reflecting or heat absorb-

ent, acid resistant, aerodynamically efficient, and others.

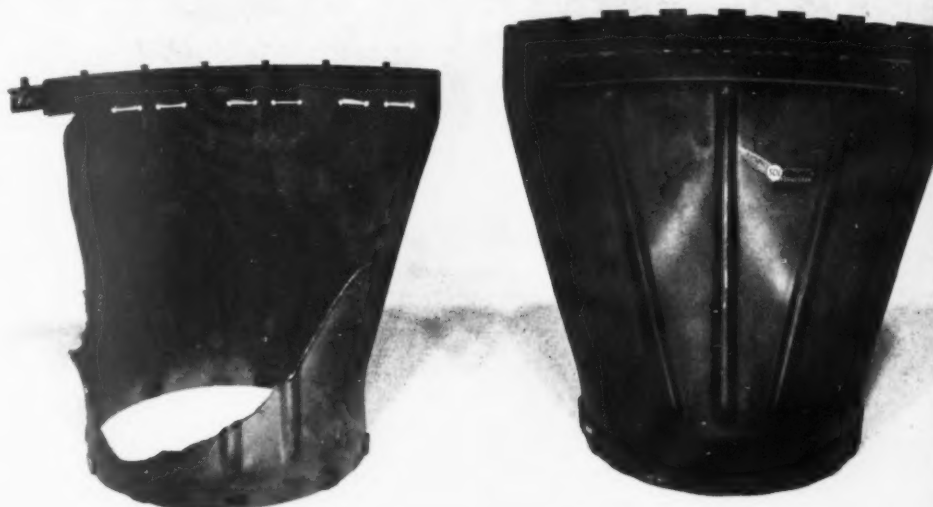
6. The coating very definitely improves the fatigue strength and mechanical properties of the base metal. (In one test, a ceramic coated metal bellows with five folds and a 1/4th inch stretch was operated through 5,051,000 cycles before coating or metal failure occurred. This is double the number of cycles an uncoated bellows will last, and is a definite indication of the new coating's extreme flexibility).

7. A single coating is sufficient for most purposes.

8. Engineers can design with greater flexibility than with uncoated parts.

9. Engine costs can be reduced using less expensive alloys. to Page 90 →

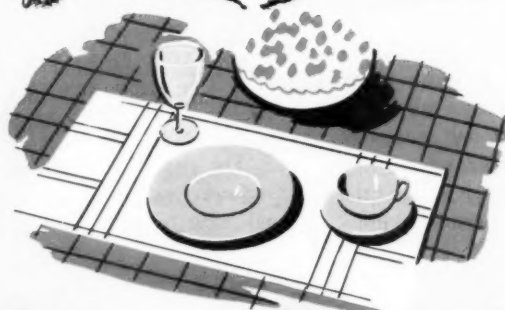
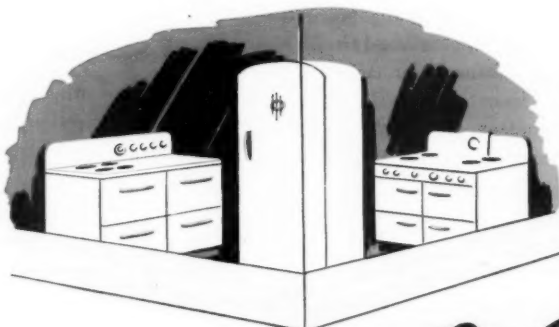
J47 jet engine transition liners after comparative exposure tests to hot jet gases. Liner on left was destroyed after 10 hours exposure; the one on the right, made of the same material and ceramic coated, is still in good condition after 60 hours exposure.





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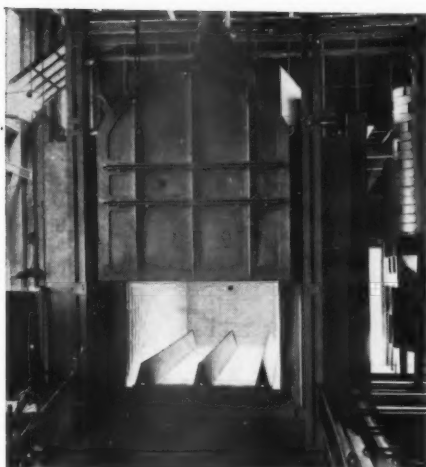
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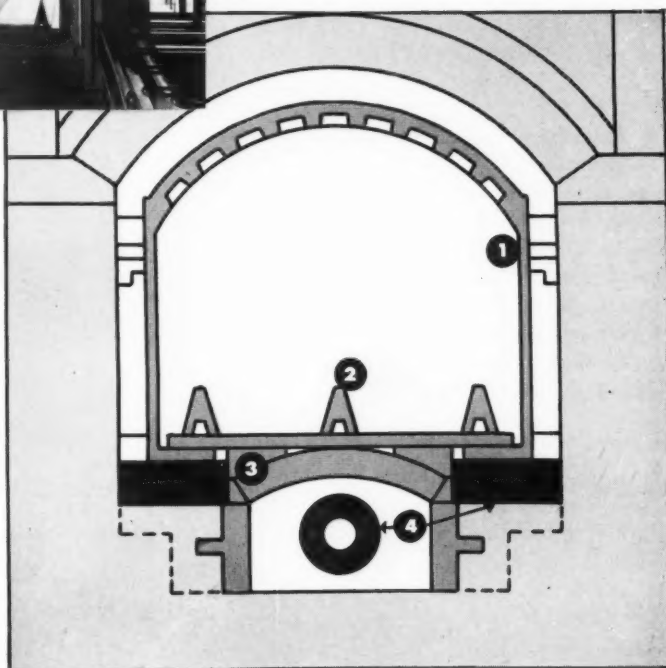
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The great hot strength of all Super Refractories by Carborundum, even at temperatures far above those reached in enameling operations—the good resistance to spalling and thermal shock—and in the case of ALFRAX electrically fused alumina and CARBOFRAX silicon carbide refractories, the very high heat conductivity—all find applications in batch furnaces of this general type.

- ① ALFRAX or CARBOFRAX muffle (depending on how hard you push the furnace) gives you maximum transfer of heat from combustion chamber to work.
- ② CARBOFRAX grate rests do not obstruct heat, and have the required strength and resistance to spalling and thermal shock.
- ③ Either CARBOFRAX silicon carbide or MULLFRAX electric-furnace mullite material (depending on fuel and method of operation) is best for support arches, pier facing and leveling brick.
- ④ For skew back-up brick and burner blocks, MULLFRAX refractories, with high hot strength and low conductivity, are usually preferred.



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A look into the future of enamel furnace design

what will the continuous enameling furnace be like in 1971—here is the answer
from a chief engineer responsible for hundreds of furnace installations

by *E. W. Dany* • VICE PRESIDENT, FERRO CORPORATION, CLEVELAND, OHIO

IN designing a continuous enameling furnace for our future needs, we are forced to project our thoughts into the distant future. Because our furnaces have a normal life expectancy of 20 years or more, it is of utmost importance that we endeavor to anticipate the type of enamels and the size of the articles that will be fired in them.

The trend to lower temperatures

If we are to gauge the future by the past, we must assume that enamel maturing temperatures will be considerably lower than they are today. We have, in our time, witnessed the decrease in ground coat firing temperatures from 1530°F. to 1430°F. Similarly, cover coat enamel temperatures have dropped from 1540°F. to 1430°F. with excellent results on the finished product due to a marked decrease in warpage, chippage, and the ability to fire ground coat and cover coats at the same time. We therefore must assume that in the not too distant future, the present 1430°F. firing temperatures may be decreased. Some enamels are already on the market that will mature at 1300°F. What this lowest temperature will be, I am not in a position to even guess; however, an assumption of 1200°F. would be in order, and well to be considered when one realizes that we are projecting our thoughts as far away as 1971.

Vertical temperature differentials

As the temperature within the furnace decreases, the furnace builders' headaches are increased and this is

certainly not a ratio of the first power. Many enamellers have already learned that the decrease of only 100°F. has resulted in a serious vertical tem-



E. W. DANY

perature differential within their furnaces. Sometimes a cold bottom and sometimes a cold top.

Yesteryear's furnaces had relatively low door openings, averaging around 5 feet, whereas today's furnaces have 6 feet, 7 feet, and 8 feet door openings to accommodate larger articles. What will be the maximum size of our refrigerator and home freezer enameled exteriors in 1960? I predict they will follow the trend of the past and continually become larger, and with it comes hand in hand, bigger and better headaches for the furnace designer—because as the interior volume of the firing zone of the furnace increases, so does the problem of maintaining uniform temperatures within it, at these predicated lower temperatures.

Now to get inside these new furnaces. To bring this subject closer to each reader, I am going to cover the three conventional types of heating mediums used in our industries' furnaces as of today. We'll omit the discussion of atomic energy for firing enamels at this time because I'm trying to confine my imagination up to 1971. The three types are: electrically heated, alloy radiant tube, and muffle furnaces.

Electrically heated furnaces give flexibility

First, we'll consider the electrically heated furnaces because they are the essence of simplicity. Some of your electric furnaces have heating elements in the hearth and sidewalls; some only on the sidewalls. These are currently divided into many zones; however, most of these are controllable only for longitudinal conveyor travel, with perhaps the hearth elements zoned separately from the sidewall elements. I predict that a further division of these zones will be necessary to properly fire low temperature enamels. A minimum of two, and possibly three, vertical zones will be found extremely helpful, with, of course, the hearth elements on their own pyrometer. If the furnaces are extremely wide, so as to handle larger pieces, it is within the realm of possibility to consider that resistors will be installed on the underside of the roof slabs, again using separate controllers for these.

Longitudinal zones will be made shorter than those of the past, so as to give greater flexibility.

Anticipating or voltage controllers for each zone instead of the present straight all-on, all-off type that is used today, would be the millennium in electric enamel furnace operation.

Radiant tube furnaces can be zoned

Now let's turn to the alloy radiant tube furnaces. These are divided into two categories, namely, long horizontal tubes on both sidewalls and the hearth, with the burners mounted on the rear wall, and the vertical, or "W" type, with the burners mounted on top of the furnace.

Horizontal zoning cannot be attained with the former, but can easily be accomplished with the latter. Side and center wall vertical zoning presents a problem, but not an insurmountable one. As we say at Ferro, the impossible only takes a little longer time.

Alloy radiant tube furnaces are a blessing, as are the electric furnaces, when repairs are taken into consideration, and who among you readers hasn't been plagued with an emergency repair when your production schedule was at its highest. I recall we had an erection crew working this past Christmas day on such

a repair job. Because these two styles can be cooled off quickly, without serious damage, they should be considered as the ultimate in furnace society.

Muffle furnaces to have

50 burners—12 pyrometers

Now to the most popular furnace in use today, our refractory muffle lined jobs. Rugged, capable of handling 100% overloads under duress, they are the true work-horses of our industry. They are usually fired with seven, nine or eleven gas and/or oil burners.

Yesterday's furnaces were, I believe, designed so as to minimize the maintenance on the burners. The easiest manner to accomplish this was to use as few as possible. Usually 1,000,000 Btu are handled by these large burners, and some even huskier than that. What happened to the refractories under the combustion chamber I should not want to happen to my most worthy competitor. They shrank, spalled, and moved around, finally toppling over and opening large holes in the hearth with resultant water vapor hitting the enamel.

Tomorrow's muffle furnaces will be fired with approximately fifty "pint-size" burners instead of nine "Big Berthas".

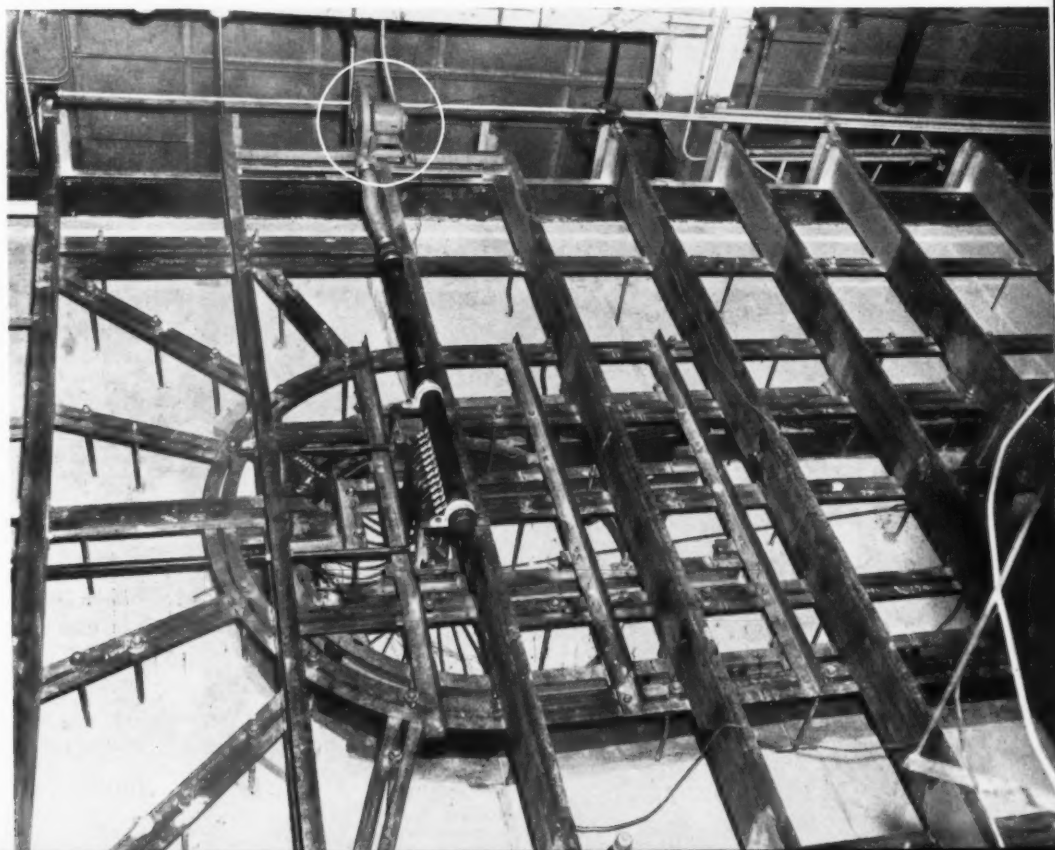
This multiplicity of smaller burners will result in longitudinal and vertical zoning. Most of the existing muffle furnaces have but one pyrometer, and we can expect twelve or more if we are to fire lower temperature enamels properly. The smaller burners will extend the refractory life and be a blessing to all of us.

We furnace builders can take a page from the book on pipe-organ design. Unlike the piano with a single keyboard, the best organ I ever heard had three keyboards, plus an unusually large number of foot pedals. The organist could effect any musical note he desired and had a thousand available at his fingertips. We can duplicate this with the multiplicity of burners divided into numerous zones and literally play a tune, temperature-wise, on these furnaces of tomorrow.

Alloy fans to increase rate of heat absorption

We are experimenting with the addition of convected heat in experi-

View of 180-degree roller turn in a U-type furnace showing blower fan (see circle) and air header for cooling same. This turn is equipped with automatic lubricating device.





Above: Showing an interior view of a U-type furnace equipped with horizontal alloy radiant tubes.

Below: Showing alloy metal "magic carpet" on hearth to facilitate the removal of fallen ware in a U-type electrically heated furnace.



mental furnaces using alloy bladed fans so as to increase the rate of heat absorption by the metal during the 70° to 1200°F. rise which occurs in the preheating zone. By controlling this rate of temperature rise, we feel we can control the oxidation of the metal, reduce hairlines, and produce a more satisfactory enamel finish and naturally decrease the rejects and/or reoperations. The acute problem here is dirt; to date we haven't produced a single piece of acceptable ware, but we haven't given up yet. You'll hear more about this at a later date.

A "magic carpet" to remove fallen ware

Digressing from heating mediums, I'd like to tell you of another novel idea we are currently working on. In the past, you have at times, perhaps all too often, had to remove fallen ware from your furnace hearth by various ways and means. I know of one furnace user who hooked a Towmotor to a nasty pile of ware in his furnace hot zone and removed it, but soon found, to his chagrin, that a king-sized portion of the furnace interior, including part of the muffle, had also been removed. However, he did continue operations for several months with this condition, much to the amazement of several "experts".

We have decided it would be more comfortable to bring the mountain to Mohamet via a "magic carpet". Essentially this carpet consists of an alloy mesh belt laying on the furnace hearth, movable in both directions, so the fallen pieces can be moved to the cleanout doors for greater ease and comfort during removal. Incidentally, the first and only "magic carpet" thus far installed is a "dud". It became hooked on the support rails and we couldn't move it. The book said this could not happen, so I'd suggest we discard the book and start all over again.

A 50 foot hot zone with 39 burners

It may be of interest to some of you that we are currently erecting a large enameling furnace which has 20 burners under the hearth, 8 in the sidewall, and 11 on the roof, all confined in a 50-foot hot zone length.

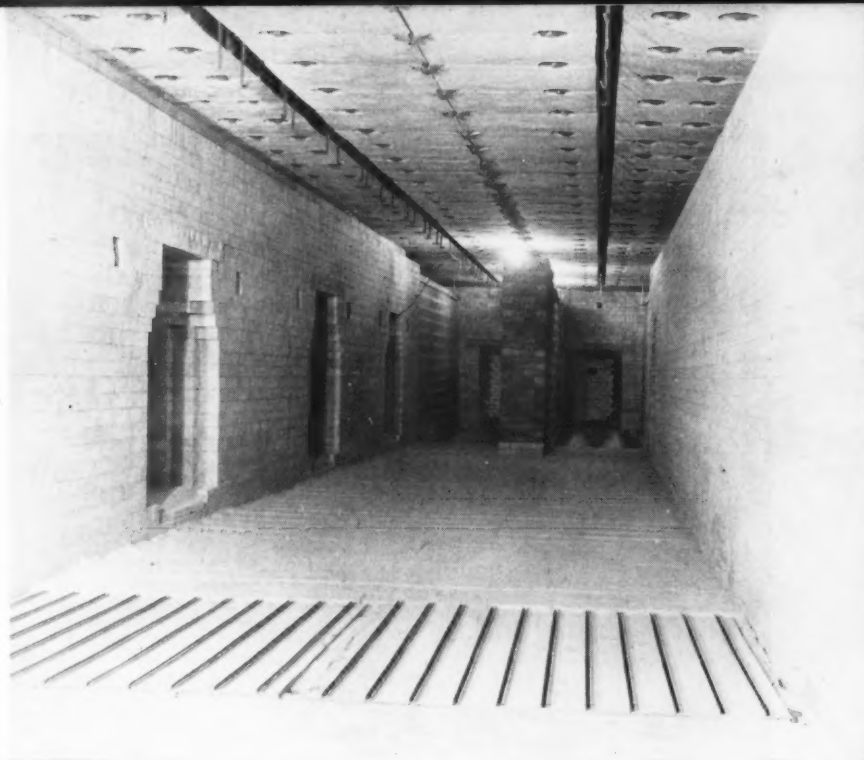
Right: Interior view of U-type furnace with refractory muffle and center wall. Air seal duct in foreground traps heat and minimizes door losses.

We certainly did not spare the horses on this one to make certain it was in a class by itself. We added two refractory chimneys, with recuperators, plus four alloy bladed suction fans for removal of the products of combustion. The total gas input is in excess of 18,000,000 Btu.

Improvements are continually being made in the slot design of these monorail furnaces. These slots are no longer lined with cast iron and cast alloy. Instead, a refractory lined slot is being used on the newest furnaces because the fluorine gases have a rapid deteriorating effect upon these metals.

Shoe plates have also come in for their share of improvement, and they needed it, too. Instead of a simple flat toboggan type we are now using a complicated stamping that not only seals the slot but also acts as a guide for the hook rods and stubs that travel thru it. Our tests on high nickel-chrome alloy shoe plates have been encouraging. One furnace has a complete set and no signs of deterioration after 14 months operation. Of course, they are expensive—about five times the cost of carbon steel shoe plates; however, if they eliminate 2% of those black specks, we feel that \$1000 is a good investment plus the fact that operators and inspectors may work more harmoniously together. However, with nickel bearing alloys so hard to buy today, it may be some time hence before many of these are installed.

Another important mechanical item that has been improved is the 180 degree roller nest turn over the hot zone of the U-type furnaces. By making this in two pieces—90 degree each—the replacement of this unit has become a pleasure rather than a chore and I'd like to say this came



to us via one of our customer's suggestion boxes—not from a furnace designer, but from a maintenance man in one of our larger enamel departments.

Using a 1/3 hp turbo blower and piping its discharged air to each roller, we have succeeded in lowering the temperature to a degree where carbonization of the lubricant is held to a minimum. The addition of a pressure feed lubricator mounted at the rear of the furnace and piped to

each roller of the 180 degree turn has eliminated the two daily trips to the top of the furnace by the maintenance man. He merely stands on the shop floor now and does a much better job than atop the furnace with his trusty oil can.

Signal system avoids wrecks

Audible signal devices have been installed on several furnaces to advise the operator when ware has
to Page 91 →



Right: Showing multiplicity of temperature controls for a continuous U-type electric furnace.



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Turning the wheels of a national trade association

describing the organization plan and committee functions
of a successful national cooperative industry institute

by *Edward Mackasek* • SECRETARY, PORCELAIN ENAMEL INSTITUTE, INC., WASHINGTON, D.C.

TO describe the operations of a national trade association it is logical that I use the organization with which I am most closely asso-

Editor's Note:

This is the second in a series of articles on the subject of cooperative trade association activity.

The first article, "The Increasing Importance of Industry-Wide Cooperation", by George P. Castner, president of the American Home Laundry Manufacturers Association, was published in September 1951 issue.

ciated, the Porcelain Enamel Institute, as my example. Although the following descriptive information relates specifically to the organization and operation of the PEI, the principle involved can undoubtedly be applied successfully in many other fields where cooperative effort is needed.

Self-help is important

Perhaps one of the most valuable characteristics of a trade association is its committee organization which allows both individuals and individual member companies to help themselves through doing. In its broadest description, PEI has gone to the root of the major industry problems and has established committees expressly to develop day-to-day as well as long range answers to such major issues as shop practise, general management problems, government business and directives, quality control and development, market research, economic research, publicity and promotion, packaging and shipping, etc.

The facilities of an Association or

Institute should meet the requirements of *all segments* of the industry it serves. PEI membership is classified into four general groups that encompass any firm in or related to the porcelain enameling industry.

Active members are those who actually operate porcelain enameling plants as their prime business.

Associate members are firms which operate captive enameling plants but are not primarily in the porcelain enameling business.

Suppliers—those wonderful folks who are usually expected only to pick up the entertainment check (but who are not asked nor expected to do so in this organization)—have a real place in PEI and active programs designed to increase their volume through promotion of the end products of the industry.

Cooperating memberships are also granted to firms which do not fall into one of the other classifications but are closely linked with porcelain enameling, such as porcelain engi-

neering and erection specialists, and those companies who use porcelain enamel but have no enameling furnaces of their own.

All four classifications of membership are further classified from the activities standpoint and are permitted to participate according to their interest or volume in connection with product classifications such as architectural, plumbingware, signs, job enameling, etc. Furthermore, a definite scale of dues is applied to each type of membership so that each member pays on the basis of sales volume or proportion of labor devoted to porcelain enameling.

Committee activities geared

Committee activities are directly geared to the industry's needs of the times and altered as circumstances vary, but most important they are also geared to a time schedule which gets things done—a habit not always common to committee work. At the beginning of the year when com-

Edward Mackasek — is one of the best known and most soundly informed men in the industry he serves. Primarily an engineering-technical personality, many years ago he adapted his bent for the technical to the management of an industry society. He holds forth in Washington, D.C., and provides the industry with government liaison from both the diplomatic and technical aspects. He travels the industry from stem to stern, attends many of the 70-odd committee meetings annually, serves as spokesman, tactician and staff manager.





R. A. Dadisman—president of the Porcelain Enamel Institute—exemplified PEI's shirt-sleeve executive approach to Institute direction. He has served as chairman of the Market Development Committee, vice president and member of the Executive Committee and Board of Trustees. He is manager of market development for one of the leading steel companies supplying base metal to the porcelain enameling industry.

mittee appointments are being made, a definite timetable of meetings and locations is also developed. A published schedule totalling about 70 committee meetings is given to all concerned so that other business trips can be planned to coincide—a plan proving helpful from the standpoint of time, cost and attendance. Also, locations for meetings are arranged in cities convenient for the majority of a committee's membership, and meetings are grouped so that committee members can attend several meetings on a single trip.

Self-benefit in committee work

A great deal of self-benefit is a common report as a result of participation in committee work. Particularly the smaller companies in the organization find that as a result of a committee membership they, perhaps for the first time, have a voice in industry-management equal to the larger firms whose general prestige has made them key spokesmen. The mixed feelings of large and small member companies being registered on any given subject tend to broaden the entire thinking and more equitable decisions are attained.

From the standpoint of the individual participant on committees, there is considerable broadening influence to the work since all segments of the porcelain enameling industry are pooling facts and problems—much coming from expert sources.

A great many of the committees number among their membership experts on production, quality control,

merchandising, research and other subjects, men who have had the opportunity to specialize and become experts through affiliation with large firms that can accommodate such specialized talent.

Professional advertising, sales promotion, public relations and market research men from member companies and the Institute's consulting agency sit in on every meeting touching on such subjects.

In this way, any company or individual devoting time to committee work can easily acquire at least as much in self-benefit as he gives in the form of time and effort. Young men in the business often profit particularly, but this also is a two-way street as the energy and willingness of the "eager-beaver" is also generally translated into accomplishment for the project at hand. Member companies frequently ask to have their men assigned to committees because of the training the individual receives as a result of participation and for the end benefit of this training to the company itself.

Commercial research

The commercial research committee's activities embrace both *market* and *economic* research and the term "research" has been chosen to indicate the studying and reporting of market and economic trends. This committee studies such new or existing markets for porcelain enamel. Data and other forms of reports to the PEI memberships are made as frequently as material justifies.

Finance

The finance committee's function is to establish an adequate and equitable means of getting the money to pay the cost of all types of Institute expenses and activities, and to insure that proper and adequate records are kept. This is also the link between the officials of the headquarters offices and the executive committee, on financial matters.

Government business

Among the newest committees, this one concentrates its attention on matters which will help the membership share in both prime and sub-contracts of the Defense Program and assist members in the interpretation of government directives. Specifically, this group functions to provide counsel and guidance to the Institute's officials relative to government dealings; to acquaint the membership with methods of approaching the numerous government procurement agencies across the country; to maintain contact with these agencies for the industry as a whole; to release information to the membership on the availability of new contracts; to issue bulletins interpreting new rulings and directives; and otherwise serve the membership with specialized knowledge about obtaining government business and observance of new federal regulations.

Institute development

While new membership is a basic duty of the development committee, its function is also to maintain a close liaison with the industry to interpret new circumstances into organization activities which will keep the Institute's functions on a progressive and timely basis. Recommendations of this committee are passed upon by the executive committee and new ideas or functions thus initiated.

Market development

This committee establishes market programs and supervises the advertising and promotional funds and expenditures budgeted for specific market development activities. Under its supervision falls the general product and Institute publicity program, educational programs, cooperative

projects carried out for other committees or divisions and other related work—all aimed at the broad objective of increasing the total opportunity for all segments of membership.

Safe transit

The activities of the National Safe Transit Committee are coordinated by the PEI as a service to all manufacturers of appliances and allied metal products. Its purpose is to coordinate the efforts of product manufacturers and the common carriers, container manufacturers, and other interested groups in a common endeavor to improve packaging and shipping practices and to reduce damage losses in shipment.

New uses

Particular importance is being attached to a committee which is assigned the task of developing new product uses. The defense production conditions are such that this committee is now required not only to determine entirely new porcelain enamel applications for the post emergency period, but also to recommend the proper use of the product in place of other more critical materials. This committee is also charged with responsibility for arranging the necessary testing and experimentation in connection with the development of new products or uses.

Process development

Objectives of this committee include searching out and reporting on the practicability of new methods, equipment and processes relative to production and improved efficiency of plant operation.

Quality development

The quality development committee is charged with all phases of quality development in the complete enameled product including the base metal, the enamel, and the two combined. The committee develops testing and evaluating methods through which quality controls can be more accurately applied, and standards and specifications against which quality may be measured. The committee also directs the activities of the Re-

Pierre B. McBride—

treasurer of PEI—is a former president of the Institute, and also vice president of his own midwestern porcelain enameling company. He administers the current operating and program funds of the Institute, and is guardian of a reserve fund in Government bonds which has been set aside to meet the operating requirements of the organization in the event of a "rainy day."



search Fellowship which the Institute has maintained at the National Bureau of Standards since 1937, and from which has emanated important technical information on porcelain enamel properties and controls.

Sales and management

This committee is concerned with both sales management problems and general management procedures. One of its basic duties is the planning and conduct of a Sales and Management Conference during which program

the majority of the committee's work is presented to the membership. Periodic reports bearing on either sales or general management are also made to the membership in general as the occasion requires.

Shop practices forum

Probably best known of all PEI activities is the annual Shop Practices Forum which is held in alternate years at Ohio State University, Columbus, Ohio, and the University

to Page 92 →

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FINISH PHOTO FROM 1948 FORUM AT UNIVERSITY OF ILLINOIS

PHOTOGRAPHS FROM PREVIOUS FORUMS

PHOTO FROM 1947 FORUM AT THE OHIO STATE UNIVERSITY



Program for PEI forum for plant men

annual shop practices forum to be held at Ohio State University

THE 13th annual Shop Practices Forum of the Porcelain Enamel Institute is scheduled for October 10, 11 and 12, at Ohio State University, Columbus, Ohio.

Participation in the Forum is open to all individuals connected with or interested in the porcelain enameling industry. The registration fee is \$15.00 for persons whose companies are members of the Institute, and \$25.00 for non-member company representatives.

All meetings will be held in the University's Archaeological Museum's New Auditorium, located on the Southwest corner of 15th and High Streets, at the main entrance to the campus.

THE PROGRAM

Wednesday Morning, October 10

9:30 Registration

10:00 Meeting of Committees

Wednesday Afternoon, October 10

Presiding
Prof. R. M. King,
The Ohio State University

1:30 Address of Welcome.....Dean C. E. MacQuigg,
College of Engineering,
The Ohio State University

Response.....Edward Mackasek,
Managing Director,
Porcelain Enamel Institute

2:00 Conservation of Materials and Equipment under Mobilization
Symposium—Savings Applied to Metal Preparation

Leader.....L. C. Farrow,
Clyde Porcelain Steel Corp.

Panel Members.....W. N. Whitehead,
The Canton Stamping & Enameling Co.
.....J. J. Baker,
International Harvester Co.

Symposium—Conservation in Enameling Operations

Leader.....Evan Oliver,
Serval, Inc.

Panel Member.....A. M. Lander,
New Process D-Enameling Corp.

Outlook for Critical Materials Used for Enameling

Leader.....Dana Chase,
Dana Chase Publications

Panel Members.....Representative of Chemical Suppliers,
Frit Manufacturers and Steel Companies

Thursday Morning, October 11

Presiding
Dr. G. H. McIntyre
Ferro Corporation

9:30 Symposium on Test Methods

Thermo-Shock Tests.....E. H. Shands,
Geo. D. Roper Corp.

Thermo-Shock Tests.....M. A. Tuttle,
North Carolina State University

Methods for Testing Enamel Coating

Discontinuities.....Stanley C. Orr,
The Pfaunder Company

Standardization of Test for Torsion.....George Warren,
PEI Fellow at National Bureau of Standards

New Developments in Tests for Fishscaling.....Grant Miller,
Ferro Corporation

Thursday Afternoon, October 11

Presiding
Edward Mackasek
Porcelain Enamel Institute

2:00 Mobilization for Defense

Executive Leadership.....C. L. Shartle,
The Ohio State University

Government Specifications for Enamels.....W. N. Harrison,
National Bureau of Standards

Conversion of Enameling Equipment.....E. E. Howe,
Chicago Vitreous Enamel Product Co.

Thursday Evening, October 11

6:30 Annual Banquet—presiding.....E. L. Yerger,
Chicago Vitreous Enamel Product Co.

Speaker.....R. A. Dadisman,
Armco Steel Corporation
President, Porcelain Enamel Institute

Friday Morning, October 12

Presiding
Dr. A. I. Andrews,
University of Illinois

9:30 New Product Development and Application Methods

Corrosion Resistance and Industrial Applications
.....W. A. Deringer,
A. O. Smith Corporation

Processing Operations in High Temperature

Coatings.....D. G. Moore,
National Bureau of Standards

One-Coat Application on Non-Premium Steel

.....Paul Cecil,
Strong Manufacturing Co.

Enameling of Aluminum.....C. R. Sigler,
The Kawneer Company

Friday Afternoon, October 12

Presiding
R. L. Fellows,
Chicago Vitreous Enamel Product Co.

1:00 Board of Experts Panel:

J. J. Baker, International Harvester Company
R. D. Beck, Binks Manufacturing Company
Mel Combs, Vitreous Steel Products Company
Paul Cecil, Strong Manufacturing Company
M. B. Gibbs, Inland Steel Company
D. R. Goetchius, Ferro Corporation
G. B. Hughes, General Electric Company
E. F. McDonald, Ingram-Richardson Mfg. Co.
M. E. McHardy, Hussmann Refrigerator Company
G. D. Martin, Pemco Corporation
E. C. Plotz, A. O. Smith Corporation
H. S. Saunders, The O. Hommel Company
J. M. Zander, Chicago Vitreous Enamel Product Co.

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Phosphatizing lighting fixtures

by Gilbert C. Close • FINISH CORRESPONDENT



Above: This innovation at Smoot-Holman provides for a brush rotating against the conveyor chain to remove adherent dirt so that it will be washed off in the machine, thus keeping the conveyor chain clean.

photos by author



Left: Hanging industrial lighting fixtures components on the 500-foot continuous conveyor. This will carry the work through a 100-foot automatic washing machine where a corrosion resistant phosphate crystal coating will be applied during a 90-second treatment interval. A chromic acid rinse follows phosphatizing to passivate microscopic areas not covered by the phosphate crystals.

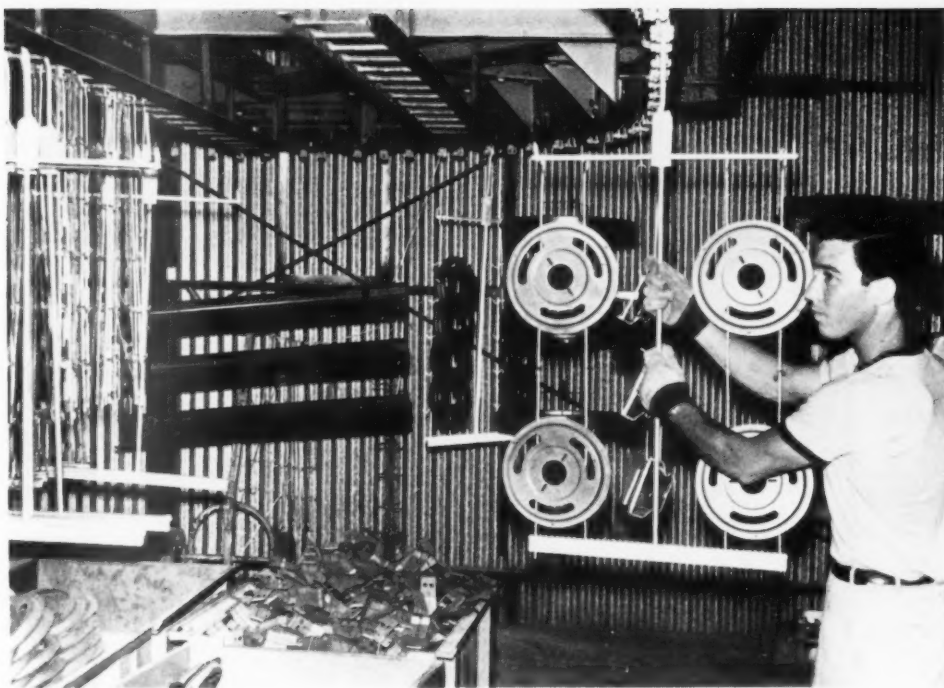
AT Smoot-Holman Company, Inglewood, California, an automatic washing machine was recently installed to clean and phosphatize industrial fluorescent lighting fixtures prior to painting. This washing machine is in-built in one side of the plant's paint shop.

The machine is approximately 100 feet long, and contains four specific zones of operation, with an 8-foot

Editor's Note:

This article on a phosphatizing production set-up was preceded in September *finish* with "Phosphatize for Finish Quality," in which the author presented a history of the process, the different treatment categories, and the basic steps involved in the process.

Right: Work emerges from the automatic washer in this area where it is ready for final painting. Phosphatizing eliminates the need of a prime coating.



approach to each zone to minimize mixing of the chemicals and rinse water.

The first zone, 33 feet long, contains a combination phosphatizing and cleaning solution. Temperature of the solution is maintained between 150° and 160° F., and is applied on the conveyORIZED work by high pres-

sure jet nozzles. Travel time in this zone is about 90 seconds.

A second 12-foot zone is used for a hot water spray rinse (150° to 160° F.). A third 12-foot zone is used for a chromic acid rinse applied by spray and operated at approximately the same temperature.

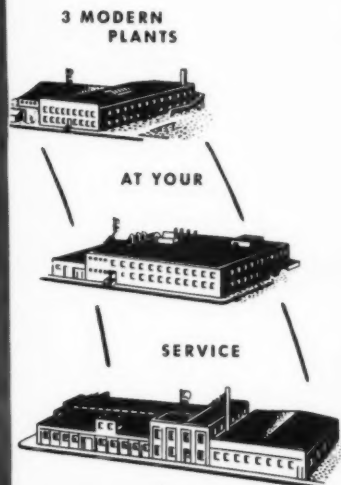
The fourth zone is a drying area

operated at 500° F. The combination surface treatment, phosphatizing, and chromic acid rinse provides a corrosion-resistant surface. It is not necessary to use a prime coating over this surface treatment, and the work is ready for final painting as soon as it emerges from the washing machine.

PHOTO COURTESY OAKITE PRODUCTS, INC.



Right: At Bulldog Electric Products Co., Detroit, operator titrates phosphate solution used in this washing machine to clean and treat electrical equipment before painting.



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Comprehensive abstracts of AES papers

selected papers from American Electroplaters' Society annual meeting

THE following are selected abstracts of technical papers presented before the annual convention

of the American Electroplaters' Society, held July 30 through August 2, in Buffalo, N.Y. A listing of authors

and their company connections may be found on page 52. (More abstracts will appear in November.)

Rinsing for electroplating

by R. J. ROMINSKI and F. L. CLIFTON

The rinsing operation in electroplating should not be thought of as an independent step in the plating sequence. It is intimately related to the preceding and succeeding operations, and rinsing techniques should be engineered from this viewpoint. The cost and efficacy of each step in the cleaning cycle is directly influenced by the intermediate rinsing steps, and the success or failure of the plating operations may depend wholly on the proper choice and efficient operation of the rinsing techniques.

The selection of one of the three common types of rinsing, i.e., still tank, spray, or fog, must be made on the basis of both technical and economic considerations. Each has

advantages and disadvantages which must be evaluated for each application.

There are several variations for even so simple an operation as still-tank rinsing. Agitation is an important variable, and can be achieved in a variety of ways. Movement of the water or the work, or both, is desirable, but the nature of the movements, their extent and duration must be tailored to fit the work.

Spray rinses are usually used in connection with still-tank and hot-water rinses, and offer savings in several ways, e.g., by keeping the final hot rinse cleaner, by causing less spotting of the work, and by reducing the steam consumption in the hot rinse.

Fog rinses are often used on racked work as it comes out of the plating solution. They are capable of reaching more remote recesses than spray rinses, and because of the small volume of water required, attractive applications which decrease drag-out losses and reclaim-rinse volume can be engineered.

It is a mistake to neglect the possibilities of economies, both direct and indirect, and of superior technical operation which may accrue from the use of purified or treated water in many rinsing operations. Modern techniques for softening, demineralizing and distilling water present the plater with an attractive array of possibilities from which he can select those best suited to his problems.

Methods of heating and temperature control of plating solutions

by W. E. STADEL and C. CIVAN

Accurate control of plating-bath temperature is necessary for the successful operation of modern plating processes. The permissible range of temperature variation is usually $\pm 5^\circ \text{F.}$, but in some cases the fluctuations must be limited to $\pm 2^\circ \text{F.}$

Steam is the usual source of heat, and it may be used in either internal coils or external heat exchangers. Internal coils are satisfactory for alkaline cleaners, hot acid dips, strikes and other solutions of comparatively small volume, but the contents of large tanks should be heated by means of external heat exchangers. In these cases it is important that

the hot solution be returned to the plating tank through a series of headers located at the bottom of the tank and protected with suitable grids.

The size of a heating coil or heat exchanger may be calculated from the specified heat-up time, capacity of tank, operating temperature, and steam pressure. It is not usually necessary to consider heat losses caused by radiation or the introduction of cold work inasmuch as the excess capacity required for heat-up will cover all heat losses incurred during normal operation.

Iron equipment can be used for alkaline cleaners and for cyanide

strikes which contain no organic material. Acid-resistant materials must be used for internal and external apparatus for the handling of acid solutions. Steel pipes lined with rubber or plastic are suitable for most acid baths. (See "Use of Heat Exchangers", May, 1951, finish.)

Air-operated controllers are recommended where close temperature control is required, and they may be adapted for either heating or cooling or both. Self-operating instruments which are actuated by vapor pressure from a thermal element in the solution may be used where comparatively coarse control is adequate.

Requirements of zinc-base diecastings for electroplating

by GLENWOOD J. BECKWITH

Zinc-base diecastings which are suitable for electroplating can be produced only when due care is exercised with regard to the design of the

article, the design of the dies, the casting technique in the foundry, and the composition of the zinc alloy.

The design of the article should be

such that polishing can be easily accomplished without expensive special equipment or excessive hand labor. The designer should also keep

in mind the requirements of the plater with respect to ease of racking for good contact, proper drainage, and satisfactory throwing of metal to all parts of the article.

A die which is not properly designed will be the source of castings that contain coarse-grained areas, cold shuts, rough surfaces, and other defects which cause the plater a great deal of trouble and may lead to a ruinous number of rejects. Even trimming dies which are not properly aligned or are otherwise faulty

will produce castings that are hard to polish, and the excessive polishing may very well cause plating troubles.

Foundry technique which does not recognize the effects of metal and die temperatures, lubricants, poor skimming, and the use of excessive amounts of scrap in the pot will inevitably lead to poor castings that will be difficult to plate properly. Even the type of furnace is important. A gas-fired furnace, for example, may be the cause of porous castings if the metal is exposed to the

products of combustion. Probably no single factor is so important as proper foundry technique in the production of good castings.

Some of the impurities which may find their way into diecasting alloys can be the source of important plating troubles. Lead and cadmium are particularly troublesome, and even small amounts will cause blistering after plating. Many other impurities, such as tin, promote subsurface corrosion, and cause effects which may be blamed upon the plater.

Chemical and electrochemical preparation of zinc-base diecastings for electroplating

by EARL W. ARNOLD

The preparation of zinc-base diecastings for plating consists of a pre-cleaning operation, electrolytic cleaning, and an acid dip or etching operation.

The precleaning, the function of which is to remove contamination to a point where the electrolytic cleaner is effective, can be accomplished by organic-solvent cleaning, emulsion soak and spray, or alkaline soak. Organic solvents can be used in the vapor, spray, or immersion techniques or combinations thereof depending on the size and shape of the parts being cleaned and the nature of the soil. Emulsion cleaners are particularly useful for zinc-base diecastings in that they are effective, economical and do not attack the base metal even on long exposure. They lend them-

selves to use in a wide variety of ways, including power-washing machines. Precleaning with alkaline-soak cleaners should be limited to those cases where contamination is slight, but such cleaners have the advantages of low initial cost and maintenance.

Electrolytic cleaning may be either anodic, cathodic, or a combination of both, but with any of the techniques, care must be exercised to see that the surface of the diecasting remain virtually unchanged after going through the electrolytic-cleaning cycle. Although the composition of the cleaner is important, the success of the operation depends largely on such factors as temperature, concentration, cleaning time and current density. It is important to replace

the cleaner frequently, or trouble from blistering or poor adhesion will be encountered.

Perfect adhesion of the deposit to zinc-base diecastings can be obtained only when all harmful films have been removed from the casting. The proper acid dip will eliminate surface oxides and chemical films from previous operations. Sulfuric, hydrochloric, hydrochloric, or fluoboric acids may be employed satisfactorily when used under the proper conditions, and phosphoric and acetic acids have found some favor. The time of immersion is determined by the first signs of gas evolution. Rinsing after acid dipping should be thorough to prevent contamination of solutions in subsequent operations.

Mechanical finishing of zinc-base diecastings prior to plating

by M. R. CALDWELL

A properly designed die with a well polished and chromium plated cavity should produce diecastings with a surface that would need no buffing prior to plating. However, even in the absence of surface defects as the casting is removed from the die, the parting lines must be trimmed off and polished, and these operations generally cause nicks and scratches that necessitate buffing of the entire bright area.

The dense "skin" on the casting should be preserved during buffing in order that the number of corrosion spots in use be kept at a minimum. Only very shallow pores in the surface can be bridged during copper-nickel plating; others can be removed by polishing or hard buffing for maximum corrosion resistance. However, air pockets in shallow pores will expand during baking of the plated castings and raise blisters.

Machine finishing is a necessity to reduce cost and meet production requirements in the author's plant with its large production—in 1950, 280,000 castings daily, weighing 0.43 lb on the average and 15.5 lb maximum.

Size and contour, required final finish, presence of holes and threads, possibility of distortion, and adaptability to automatic machine polishing are taken into account in the choice of finishing method.

Many small parts are barrel burnished, sometimes after a strapping (belt polishing) of the parting line, in 2-compartment, 32-inch diameter, 60-inch long barrels, run at 30 rpm at first and then 6-10 rpm for final coloring.

Parting lines are usually strapped, by hand or automatically, before buffing. Abrasive belts are preferred to set-up wheels because of elimination of skilled labor and savings in

material and labor. Polished areas and coarseness of polishing grain are continually kept at the minimum required by the condition of the part, and use of grease stick at a maximum, to reduce cost of subsequent buffing. Type of buff and buff speed are carefully selected for the same reason.

Liquid tripoli buffing compounds are rapidly gaining favor, even in hand buffing, and are carefully selected for minimum consumption, buff wear, and ease of removal by cleaning. Applications can be made automatic. The recirculating pump-type system is preferred over the pressure-can system because it eliminates transfer of compound and keeps it uniform.

A wide variety of automatic buffing machines are used: semiautomatic, reversing type with only one fixture (two to a part), straight-line and

return-type full-automatic with fixture guides and tilting mechanisms. Areas not reached on the machine are touched up by hand, sometimes

with a portable high-speed head when the fixture is turning an end of a return-type automatic.

Optimum wheel pressure, once set,

is controlled by an ammeter on the motor, which automatically considers the wheel speed.

Electroplating zinc-base diecastings

by CHESTER G. BORLET

One or more of a large number of metals may be deposited on a zinc-base diecasting, but all coatings must conform generally to specifications which cover general appearance, arrangement of multiple deposits, minimum thicknesses, resistance to salt-spray, ductility, and adhesion.

In all of the plating processes employed in meeting the specifications, careful control must be exercised over the variables which are responsible for the success of the plating operation. The variables can be divided into two categories, namely, internal variables, comprising composition, pH temperature, current density, and impurities; and external variables, which include rinsing, agitation, current source, plating

racks, and filtration.

Even though all components of a plating solution may be present in the correct relative amounts, excessive or insufficient total concentrations may result in poor deposits. Some baths are particularly sensitive to pH, and must be controlled very carefully. Current density and temperature are closely inter-related, and the selection of operating ranges for each of these variables requires a careful consideration of many factors, among which the geometry of the work and the current distribution on it are of utmost importance. Impurities are a fruitful source of plating difficulties, but techniques for their removal have been well established.

Sufficient rinsing facilities should be provided to remove all chemicals from the work before it goes to the next operation. The necessity of continually replenishing the solution around the cathodes requires agitation, which may be accomplished in a number of ways, either mechanically or pneumatically. Whatever the current source, it should be designed for the work in hand and operated under the conditions of load for which it was designed. Well-engineered racks properly coated with an insulator which will not contaminate the solution are required for the production of good deposits. Proper filtration helps immensely in the avoidance of rough deposits.

Phosphate coatings

by ALFRED DOUTY

When one compares the manifold purposes for which electrodeposits and phosphate coatings have been used, one finds that the two have many common objectives, as well as applications which are specific to each of them. But in those applications which appear to be common, one kind of coating or the other is often more frequently employed for a specific purpose. Metal finishers should be familiar with the possible applications of each type of phosphate coating if they are to use it either as a first choice or as a substitute. (See "Phosphatize for Finish Quality", September, 1951, finish.)

Phosphate coatings are commonly applied to iron, steel, zinc, cadmium

and aluminum surfaces. Zinc, manganese or iron phosphate coatings are used with ferrous materials, the choice being dependent on the type of alloy which is to be treated. Zinc phosphate films are applied to both zinc and cadmium surfaces, and aluminum can be processed for the formation of either a crystalline zinc phosphate or an amorphous aluminum-chromium phosphate. Almost without exception, the coatings are given a supplementary treatment with paint, protective oils, or waxes.

Many techniques, such as dipping, spraying, hand brushing and tumbling, may be used to build up coatings of weight ranging from 30 to 4000 mg/ft².

Relatively thin coatings are best as substrates for paints and organic coatings. The actual weight depends upon the nature of the work and the amount of deformation to which it may be subjected after phosphating. Heavy films should be used where the supplementary treatment involves oils or waxes. Manganese phosphate coatings are particularly adapted for friction surfaces, alkaline exposures, and high-temperature environments.

Maximum corrosion resistance and minimization of paint blistering can be obtained when the phosphate coatings are given a final rinse in dilute chromic acid with or without phosphoric acid.

Black oxide coatings on metals

by DR. WALTER R. MEYER

The purposes for which black oxide coatings may be applied to iron, steel, copper, stainless steel, zinc, cadmium, and aluminum include substitution for other finishes, low light reflectivity, color contrast, economy, reduction of friction, and resistance to flaking.

The black oxidation of iron and steel may be accomplished by heat tinting, oxidation in fused nitrate

baths, or oxidation in aqueous alkaline solutions. The aqueous alkali process is the most widely used, and there are modifications of it which may be employed under various conditions of time and temperature to produce coatings with a variety of properties. Nitrates, nitrites, chromates and chlorates are common additions to the sodium hydroxide solutions. The coatings produced by

any of the processes provide only limited corrosion protection, and the finish should be protected with oil. Stainless steels are usually treated in a bath of fused sodium dichromate, which will yield a coating with excellent corrosion resistance and colors that are dependent on the time of treatment.

The velvety coatings which are

to Page 50 →

→ from Page 49

produced on copper with a sodium hydroxide solution containing an oxidizing agent, can be polished by wiping or tumbling. Oxide coatings formed on copper in this and other ways are excellent bases for organic finishes.

Black coatings on zinc and cadmium consist of other metals or oxides deposited from black nickel, molybdate or chromate solutions. The various deposits differ in their corrosion resistance, wear resistance, and other properties, and selection of a process depends on the end use of

the particular finished product.

The best method of treating aluminum involves the dyeing of an anodized coating.

There are upper limits of temperature to which black oxide coatings can be exposed without detrimental effects.

Practical applications of diaphragm tanks in the electroplating industry

by EZRA A. BLOUNT

The simplest form of diaphragm-tank installation comprises a tank which is separated into anode and cathode compartments by means of porous diaphragms, plus auxiliary equipment for pumping the solution from the anode compartment, through a filter, and back into the cathode compartment. This elementary arrangement may be modified to include heat exchangers, electrolytic purification tanks, and other special equipment which may be required in a particular process.

Although the obvious advantage of the diaphragm tank is the elimination of individual anode bags, which are a nuisance with nickel and a virtual impossibility with high-speed

copper, it has been found in practice that other benefits may be realized. Higher anode current densities may be used; roughness caused by stray dust, dirt from make-up chemicals, or other sources is reduced; and it is easier to buff the plated work. It must not be imagined, however, that diaphragm tanks will solve all plating troubles, and there are even sources of roughness which will remain operative.

Experience has shown that although conventional tanks can sometimes be converted successfully into diaphragm tanks, it is best to install new tanks complete with all accessory equipment. Only in this way can optimum arrangements be made

for all parts of the system, particularly means for removing solution from the anode chamber and introducing it into the cathode chamber.

Although 11- or 12-oz. canvas duck, with a service life of from six months to a year or more, is the most popular diaphragm fabric, a number of synthetic materials have been investigated. Nylon, Dynel and Chemstrand are among those which show promise.

The diaphragm-tank system has no limitations, small or large, so far as size is concerned, and its benefits may be realized in the laboratory, in the small job shop, or in an enormous automatic line.

Nickel plating with insoluble electrodes

by W. A. WESLEY, D. S. CARR and E. J. ROEHL

Although a nickel plating process which involves insoluble anodes would not be attractive to the decorative-plating industry, it offers distinct advantages in such other fields as the plating of steel strip and wire, electroforming of screens, plating of rolls, and plating of the inside of tubes. The principal difficulty with the process in the past has been in devising means for replenishing the nickel content of the bath cheaply and with good control.

Replenishment can be accomplished on a continuous basis for a chloride-free nickel plating bath by means of a process which involves circulation of the electrolyte through a plating tank, a regeneration tank, and

a filter. Nickel is dissolved in the regeneration tank at a controlled rate with the aid of periodic reversal of the current, and the pH of the solution increases. In the plating tank the nickel content of the electrolyte is depleted, and the pH decreases. If the electrode area in the regeneration tank is adequate, the composition and pH of the electrolyte can be controlled simply by adjusting the current in this tank. When the plating tank is operated at 40 asf, the regeneration tank can be run at 10 asf, and the pH held at 1.5. Under these conditions, the cathode current efficiency in the plating tank was 68 per cent, and the power consumption for dissolving nickel in the regenera-

tion tank was 0.78 kw-hr per pound. The power costs for the regeneration cell are small, because it can be operated with close electrode spacing, a low current density, and a series-parallel electrode arrangement.

The nickel deposits from the chloride-free bath have approximately the same mechanical properties as those obtained from a Watts bath. The hardness and tensile strength are a little higher, and the ductility somewhat less.

The process does involve a problem in ventilation, in that copious quantities of gases are liberated at electrodes and give rise to considerable spray.

A new degreasing evaluation test—the atomizer test

by H. B. LINFORD and E. B. SAUBESTRE

A special specimen for the evaluation of tests for degreasing processes which exhibits uniform drainage has been designed and tested. It comprises a rectangular area of sheet metal with a tongue having an "S" bend at the top and a triangular ex-

tension at the bottom, and experience has shown that reproducible soiling and cleaning procedures can be carried out with it.

In the course of a study of tests which have been suggested for the evaluation of degreasing processes,

it was found that a new procedure appeared to be far more sensitive than previous tests. The specimen to be evaluated is allowed to dry and is then sprayed for 30-45 sec with a dilute aqueous solution of a dye from an atomizer at a distance



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of 2 ft with a pressure of about 18 inch of mercury. After being dried with a heat lamp, the specimen will exhibit a dye pattern which reveals the areas that were not free of oil or grease. Permanent records can be easily made by tracing the dyed areas with a pantograph. It is suggested that the superiority of the atomizer test over the water-break test is due to its dependence upon an advancing contact angle instead of a receding contact angle.

The atomizer test was compared with the fluorescent-dye, spray-pattern, ferricyanide and copper-dip tests for the evaluation of the residual oil on partially cleaned specimens which had been soiled with lard oil

or mineral oil. When considerable residual oil remains on the specimen, the atomizer and fluorescent-dye tests have about the same equivalent sensitivity and are 20 times more sensitive than the other tests. The atomizer test improves as the amount of residual oil is decreased and for small amounts may become 20 times as sensitive as the fluorescent-dye test and 600 times as good as the ferricyanide test. Radioactive-tracer techniques may be this sensitive, but they are both expensive and technically difficult, whereas the atomizer test is so simple and cheap that it may be used in even the smallest plating shops.

Rust preventives

by ARNOLD W. ACKERMAN

Rust preventives differ from other metal finishes in that they are readily removable with cheap solvents. They can be divided into three main classes, namely, fluid materials applied at room temperature in solvent solutions, solid materials applied hot, and lubricating oils. The first two are superior to the third, and most field problems can be handled by the first.

Surface preparation and cleaning are as important as in other metal finishing processes, and selected standard cleaning techniques can be used.

The choice of rust preventive material depends upon the type of ex-

posure and the degree of protection required, the composition of the work to be preserved, the type of finish, the design and complexity of the work, whether or not the preservative is to provide other functions such as lubrication or the hydraulic transmission of power or movement, and the nature of the packing, if any, to be used over the preservative.

Within the framework of these requirements there are many details which must be properly evaluated to determine the most suitable material.

The methods that are used to evaluate rust preventives include salt-spray test, high-humidity tests, immersion in fresh or sea water,

weatherometer test, indoor and outdoor exposures of all sorts, water-displacement tests, and fingerprint-removal tests. Experience has shown that the accelerated tests are not as reliable as those in which no substitution is made for elapsed time. Pressure effects, which are seldom encountered in other metal finishing operations, are often of importance and must be taken into consideration if test methods are to be significant.

Special problems which are peculiar to the rust preventive industry include dermatitis, which may arise from the handling of some materials, and the fire hazards that accompany the use of volatile and flammable solvents.

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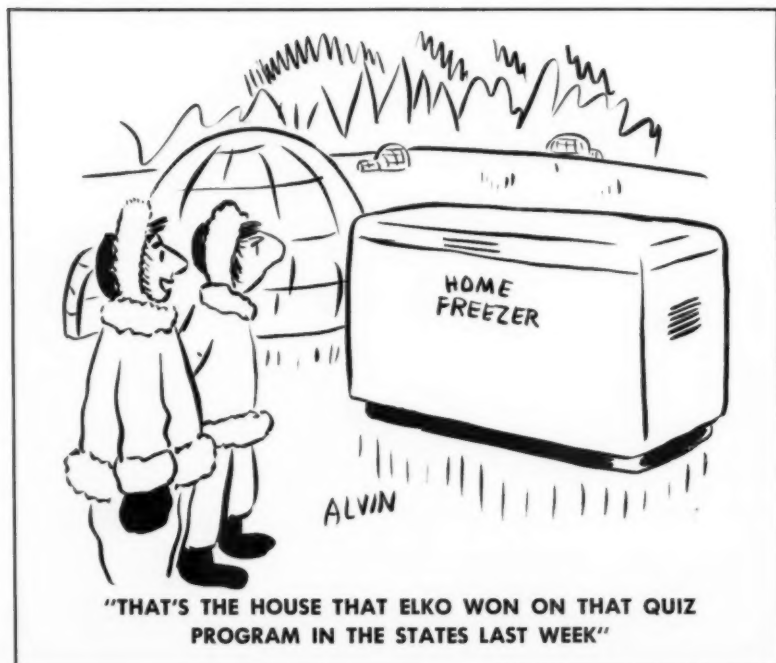
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Program for paint production clubs meeting

29th meeting of production groups in Atlantic City, following annual meeting of National Paint, Varnish and Lacquer Association

THE 29th annual meeting of the Federation of Paint and Varnish Production Clubs will be held in Atlantic City, at Chalfonte-Haddon Hall, October 31-November 3, immediately following the annual meeting of the National Paint, Varnish and Lacquer Association.

Registration will begin Wednesday afternoon, October 31. The annual Paint Industries Show will be held from Wednesday afternoon until Saturday noon. The banquet is scheduled for Friday evening.

TENTATIVE PROGRAM

Thursday Morning, November 1

- Greetings.....R. D. Bonney
President of Federation
- Welcome.....G. H. Wescott
Chairman of Meetings Committee
- "Properties of Orange Pigments".....H. Gough
Philadelphia Club
- Report on the Paint Industries Show
- "Measurement of Dry Hiding Power of Paints".....E. S. Dunn
New York Club
- Annual Business Meeting and Election of Officers

Thursday Afternoon, November 1

- Report on Activities of Scientific Section of National Paint, Varnish and Lacquer Association.....J. C. Moore
Director of Scientific Section
- Annual Report of the President.....R. D. Bonney
- Address by President of National Paint, Varnish and Lacquer Association.....J. F. Battley
- Report by Chairman of the Materials Committee.....W. P. Colio
- "Preliminary Study of the Morehouse Mill".....W. Foy
C. D. I. C. Club
- "Survey of Straining Methods Used in Paint Industry".....H. Ellsworth
New England Club
- "Filtering and Standards and Tests for Cleanliness".....A. Barkman
Chicago Club
- Report of Standards and Methods of Test Committee.....F. M. Damitz
Chairman of Test Committee
- "Flooding and Floating of Pigments".....E. G. Shur
New York Club

Friday Morning, November 2

- "A Study of Primers for Ferrous Metals on Atmospheric Exposure: VI".....T. Dembski
New England Club
- "Study of Pigment Volume in Exterior House Paints".....D. E. Wiley
Montreal Club
- Report by Chairman of Liaison Council.....R. W. Matlack
- Guest Speaker.....H. Brayman
Public Relations Director, E. I. du Pont de Nemours & Co., Inc.
- Report of Joint Federation—Association Technical Education Committee.....E. H. Ott

Friday Afternoon, November 2

- "Correlation of Flash Point Equipment".....V. L. Sahli
Cleveland Club
- "Thermal Polymerization of Esters of Unsaturated Fatty Acids".....Joseph J. Mattiello Lecture—Dr. H. D. Wheeler
Research Laboratories, General Mills, Inc.
- Report on the Federation Research Program:
- Report by Chairman of Educational Committee.....P. O. Blackmore
- Report of Research Program Coordinator.....W. O. Lundberg
- "Rate of Erosion, and Hardness and Abrasion Resistance of Drying Oil Films".....R. C. Adams
Gilman Paint and Varnish Co.
- "Chemical Changes in Films with Aging".....Dr. R. E. Dunbar
Head, School of Chemical Technology, No. Dakota Agricultural College
- "Changes in Infra-Red Spectra of Films".....R. W. Auxier
Manager, Chemical Dept., Westinghouse Research Laboratories
- "Depth to Which Oxygen Penetrates Drying Oil Films".....Dr. L. L. Carrick
Dept. of Chemical and Metallurgical Engr., University of Michigan
- "Stress-Strain Properties of Clear and Pigmented Pure Ester Films".....Dr. A. C. Elm
Technical Director, Standard Varnish Works & Toch Bros., Inc.
(research at New Jersey Zinc Co.)

Saturday Morning, November 3

- "Styrenation and Esterification of Tall Oil".....Dr. W. Bosch and R. R. Drubel
North Dakota Agricultural College
- Report by Chairman of Manufacturing Committee.....N. T. Phelps
- Round Table Discussion—"Straining and Filtering Problems in Production".....H. Kelfer (moderator)
New England Club
- Round Table Discussion:
"Specification Finishes".....J. K. Straith (moderator)
Detroit Club

Adjournment

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SUCCESSFUL TEST RUNS ON LVT MADE BY INGERSOLL PRODUCTS

Successful test runs of the first pilot model of the Navy and Marine Corps news LVT, Landing Vehicle Tracked, built at Kalamazoo, Mich., by Ingersoll Products Division of Borg-Warner Corp., were announced August 10 by Robert S. Ingersoll, president.

Completely new in design and much larger than the famous Beachbuster of World War II, the Ingersoll test model was completed just seven months from the start of the design program.

AMERICAN STOVE TO MAKE FUEL TANKS FOR B-47'S

American Stove Co., St. Louis, will soon start production on large fuel tanks for three major aircraft firms manufacturing the new B-47 "super-jet" bomber. This is the company's sixth current defense job, and will not interfere with production of Magic Chef consumer goods, a company spokesman said.

WESTINGHOUSE ANNOUNCES PLANT EXECUTIVE LINE-UP FOR MANSFIELD - COLUMBUS

According to J. H. Ashbaugh, vice president in charge of Westinghouse Electric Corp.'s electric appliance division, the following appointments have been made for the plant management of the new plant now under construction at Columbus, Ohio, and the present works at Mansfield, Ohio:

C. L. Van Derau, general works manager, Mansfield and Columbus; E. L. Smith, works manager, Columbus; C. D. Heaton, manager of manufacturing, Columbus; P. J. Backman, works manager, Mansfield; D. B. Fighter, manager of manufacturing, Mansfield; J. B. Roman, works engineer, Columbus; Christ Reining, works engineer, Mansfield.

FRIEDBERG NAMED TO U. OF I. POST ON EUMC PROJECT

Arthur L. Friedberg has been appointed research associate in the Department of Ceramic Engineering at the University of Illinois on the Enamelled Utensil Manufacturers

Council cooperative project for the development of improved tests and enamels for the kitchenware industry.

A graduate of the University of Illinois with a B.S. degree in 1941, Friedberg also attended the University of Chicago and the University of Illinois to take graduate work toward a Doctor's degree. He served in the Navy from 1943 to 1946 and became a Lieutenant.

Friedberg has had five papers published in the field of porcelain enamels dealing with the opacity, development and properties of titanium enamels, and was one of the co-authors of one of the first papers on replica techniques.

WHIRLPOOL STAFF CHANGES

Kenneth MacGrath, vice president in charge of manufacturing, Whirlpool Corporation, St. Joseph, Mich., assumed the duties of general vice president, effective October 1. In this newly-created position, he will have major responsibilities for planning the company's future programs.

Donald W. Alexander recently with Mallory Corp., has been elected vice president in charge of production. He formerly was general manager of Stewart Warner's refrigerator and stove division.

ST. CHARLES MFG. MILLION DOLLAR PLANT NEARLY COMPLETED



A million dollar plant for St. Charles Manufacturing Co., St. Charles, Illinois, will be ready for occupancy the latter part of October, according to a company spokesman. Equipment for fabricating, assembly

and finishing the company's line of custom-built steel kitchens is being installed.

The new facilities are located on a 12½-acre plot, located on Route

to Page 62 →



The official banner—of the World Metallurgical Congress, to be displayed in Detroit, October 14 to 19, by the American Society for Metals, has been approved by the Society's top officers. Left to right, Dr. John Chipman, head, Department of Metallurgy Massachusetts Institute of Technology, and president elect; William H. Eiseman, executive secretary, Cleveland, and Walter E. Jominy, chief metals consultant, Chrysler, and ASM president.

Attendance at the Congress is expected to reach some 45,000 metal engineers and industrial executives of whom 500 are coming from 21 of the free nations of the world. The international gathering on metal resources of the world meets concurrently with the 33rd National Metal Exposition.

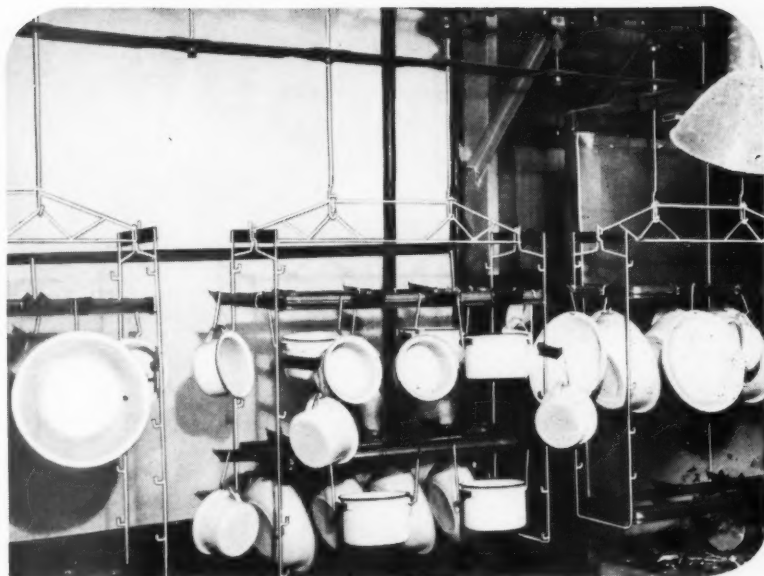
ECA team from France—pause for a photo in front of one of the manufacturing buildings of The Arco Company, Cleveland. Eager to absorb American know-how in paint manufacturing, this team is visiting several paint manufacturing plants in America in order to gain knowledge that will increase efficiency and productivity of the French industry.



Mural on tools—of modern porcelain enamel research is shown in the office of Dr. G. H. McIntyre, left, director of research, Ferro Corporation, Cleveland. The mural is the work of H. Edward Winter, right, nationally-known for his use of porcelain enamel as an art form.

Winter used four section of enameling steel 24" x 36", applied the 9-color design with templates and by hand, then fired each coat. Equipment pictured includes a spectrophotometer, X-ray analyzer, electron microscope, interferometer, and chemical retort.

Lightweight Inconel burning tools, designed and fabricated by STROHECKER, INC., Enon Valley, Pa.



37% Drop in Fuel Consumption...made possible by new, light Inconel tools

Moore Enameling & Mfg. Co., of West Lafayette, Ohio, had been using burning tools that weighed about 67 pounds and required considerable maintenance.

Then they changed over to fabricated wrought-Inconel® tools. The new tools weighed only 33 pounds, yet they carried the same load of 63 pounds.

The tools have been in use a year and a half. During this period, C. H. Kehl, Chief Engineer at Moore Enameling, compiled some interesting data.

On Gas Consumption, Mr. Kehl wrote:

"No. 3 furnace with heavy tooling, based on five working days during February, 1950—148,767 cu. ft. was average consumption per day.

"Same furnace with new light fabricated tooling, based on five working days in each of the months of January, February and March, 1950 — averaged daily consumption 93,320 cu. ft. This shows a saving of approximately 37% ..."

About Furnace-Operating Temperatures:

"It was necessary to maintain a hot-zone temperature of from 1580° to 1590°F. with heavy tooling, as compared to 1535°F. now required with the new light tooling. The chain speed is the same as with heavy tooling.

"We had no way to determine the comparative combustion chamber temperature gradient between combustion chamber and the inside of the furnace, but would estimate that the combustion chamber temperature was at least 200° lower than required when the heavy tooling was used."

The fabricator of the tools, Strohecker, Inc., chose Inconel for this equipment because of its strength and workability, which permit fabrication of lightweight sections—plus its resistance to high-temperature corrosion.

At present, INCO Nickel Alloys are being diverted to defense applications. However, INCO welcomes the opportunity to help you with your high-temperature metal problems.

For help in planning for immediate defense needs, or for future installations, write INCO's Technical Service Section, giving specific details.



THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

INCONEL®...for long life at high temperatures

finish OCTOBER • 1951

WILL YOUR PRODUCT

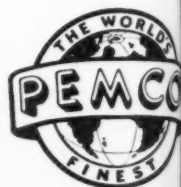
Citric acid, of course, is the accepted test to determine porcelain enamel's acid resistance. But you have no way of knowing what *your* porcelain enameled product is going to face in its many years of usefulness. You cannot afford to take a chance on anything less than the best. Pemco Porcelain Enamel Frits have become the accepted standard with leading manufacturers throughout the world. With Pemco Porcelain Enamel Frits, you are assured the uniformity of quality and the economy of performance this uniformity assures, both so important to any successful porcelain enameling operation.

"After All, It's the Finish that Counts"

PEMCO CORPORATION

5601 EASTERN AVE., BALTIMORE 24, MARYLAND

"THE WORLD'S FINEST" PORCELAIN ENAMEL FRITS • GLAZE FRITS • PORCELAIN
ENAMEL COLORS • GLAZE STAINS • GLASS COLORS AND RELATED CERAMIC MATERIALS.



"Always Begin with a Good Finish"

STAND THIS ACID TEST?



Let PEMCO solve your technical problems

Next to the quality of its materials, Pemco prides itself on the continuing service it performs for the porcelain enameling industry. If you have a technical problem, we invite you to discuss it with our laboratory technicians and engineers. Wire, phone or write today! There's no obligation, of course.



NEWS → from Page 57

64 and Tyler Road, with a major railroad line nearby. The modern factory is a single-story building, with the exception of a small basement section and a penthouse over the paint spray room to house air replacement units.

The expansion program of the kitchen company comes after 15 years of operation. In 1935, St. Charles Mfg. was established, with factory and offices located in a building pre-

viously occupied at the west limits of St. Charles. Until about three years ago, the company offices continued to occupy this building, which still houses the main manufacturing

phases. The company's general offices are now located in downtown St. Charles. The original building will continue to be used for certain manufacturing operations.

PAINT INDUSTRY TO MEET IN ATLANTIC CITY, OCT. 29-31

The annual convention of the National Paint, Varnish and Lacquer Association will be held at Haddon Hall, Atlantic City, N.J., October 29, 30 and 31.

The convention will open Monday afternoon, October 29, at which time Roy B. Anderson will present the Treasurer's Report, and Joseph F. Battley, NPVLA president, will make his annual report. Guest speaker will be Leo M. Cherne, executive secretary, Research Institute of America.

Tuesday morning will be the Industrial Product Finishes Session. Featured will be a program of military lacquer specifications with a panel comprised of: Dr. C. A. Pickett, chief, Paint and Chemical Laboratory, Aberdeen Proving Ground; Dr. Alfred Mallon, Bureau of Aeronautics, Department of Navy; Dr. E. E. Jukkola, Wright-Patterson Air Force Base; and Dr. Warren Subbeline, Research and Development, Quartermaster General, Department of Army. W. O. Bracken, of Hercules Powder Co., will serve as moderator. This will be followed by a luncheon for industrial product finish manufacturers, and a management forum.

Tuesday afternoon, a stage presentation will combine the Association's national advertising program (Clean Up — Paint Up — Fix Up) and the paint power sales training program. Senator Wallace F. Bennett, of Utah, will be the principal speaker.

Wednesday morning will be devoted to a Government Controls Symposium, with representatives of NPA, OPS, and the Department of Agriculture in attendance.

MAURER NAMED NESCO MFG. V.P.

The election of Mel E. Maurer as vice president of manufacturing was announced by William Howlett, president, Nesco, Inc. Maurer will direct all manufacturing, purchasing and engineering.

WYANDOTTE PROMOTES TUCKER

Robert K. Tucker, industrial department representative in the Chi-

*Our plants are part of
your production line*



**WE KEY OUR SHIPMENTS
TO YOUR PRODUCTION
SCHEDULE...**

*saving you storage space,
extra handling and inventory costs.*

The universal appliance insulation



FIBERGLAS
insulated

*Fiberglas is the trademark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for products made of or with fibers of glass.

cago district of Wyandotte Chemicals Corp. since 1947, has been named manager of the company's St. Louis district.

FERRO BUYS T & H ENGR. FIRM

Ferro Corporation, Cleveland, has announced the purchase of all patents, inventories and facilities of The T. & H. Engineering Co., Kirkland, Illinois. T. & H. will be merged with Ferro Electric Products, Inc., also of Kirkland.

TENNESSEE STOVE EXPANSION

Tennessee Stove Works, Chattanooga, is developing plans for a plant expansion to provide for a new vitreous enameling plant unit. It will be a one-story building, and will cost approximately \$167,000, with equipment.

DOMESTIC RANGE SHIPMENT

FIGURES FOR FIRST 7 MONTHS

Shipments of domestic gas ranges for the first seven months of this year totaled 1,442,200, according to figures supplied by the Gas Appliance Manufacturers Association. Electric range shipments for the same period totaled 938,900, said the report.

GAS WATER HEATER SHIPMENT

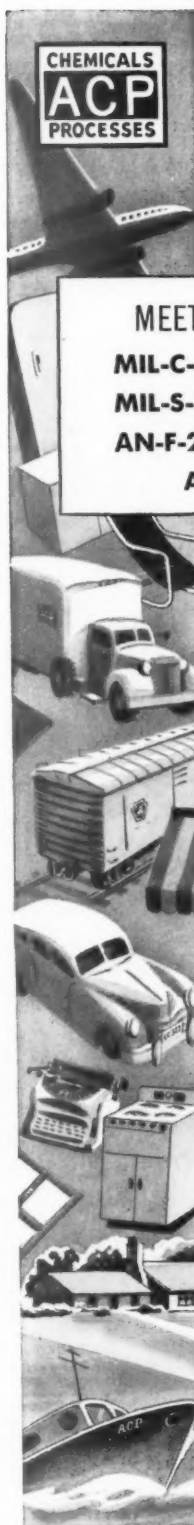
FIGURES FOR FIRST 8 MONTHS

Automatic gas water heater shipments during the first eight months of 1951 totaled 1,403,200 units. This was 6.3% below the 1,496,900 units shipped during the similar period of last year. August shipments of this year totaled 132,300 units, and 259,800 in 1950.

GERITY-MICHIGAN TO MAKE PARTS FOR J-47 TURBOJET ENGINE

Gerity-Michigan Corp., Adrian, Michigan, has received an order from Packard Motor Car Co. to manufacture compressor front frames, in connection with production by Packard of the "Dash 23" version of the J-47 turbojet engine.

finish OCTOBER • 1951



CHEMICALS
ACP
PROCESSES

Alodine[®]

PROTECTS ALUMINUM ANCHORS THE PAINT FINISH

MEETS GOVERNMENT SPECIFICATIONS

MIL-C-5541 U.S. Navord O.S. 675

MIL-S-5002 16E4 (Ships)

AN-F-20 U.S.A. 72-53 (See AN-F-20)

AN-C-170 (See MIL-C-5541)

EFFECTIVE, ECONOMICAL EFFICIENT

ALODIZING is an electroless protective surface conversion process for bonding paint to aluminum and protecting the metal.

Tough, durable **ALODIZED** surfaces are obtained easily and rapidly by immersion, brushing, or spraying in a multi-stage power washer.

ALODINE amorphous phosphate coatings provide extra paint permanence and extra durability for aluminum parts and products.

BRUSH "ALODINE" PROTECTS ALUMINUM IN THE FIELD, SHOP, OR HANGAR

Brush **ALODINE** is easily applied in a simple brush-on or flow coat process to large assemblies and surfaces—airplanes, trucks, trailers, boats, housing, building siding, railway cars, bridges, etc.—that are too bulky or too remote to be conveniently treated in tanks or a multi-stage power spray washer. The cleaning and coating chemicals for Brush **ALODIZING** are shipped in bulk or in the convenient Brush **ALODINE** Chemical Kit No. 1. This Kit contains enough chemicals to treat about 1,000 square feet of surface and is an ideal package for use at airfields of commercial airlines or of the Armed Services anywhere.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY
AMBLER, PA.

Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals

DATE CHANGED FOR METAL TRADES ASSN. CONVENTION

Homer D. Sayre, commissioner of the National Metal Trades Association, has announced a change in the date for the Association's 52nd annual convention. Formerly scheduled for September 27 and 28, it will be

held instead on November 19 and 20 at the Palmer House, Chicago.

The Association's annual award for outstanding achievement in the field of industrial relations will be given at the meeting. One of the two previous awards was won by Louis Ruthenburg, chairman of the board, Servel, Inc.

DEFENSE SUBJECTS TO HEAD PROGRAM AT PORCELAIN ENAMEL INSTITUTE ANNUAL MEETING

Defense topics promise to be the top interest subjects at the 20th annual meeting of the Porcelain Enamel Institute to be held at The Greenbrier, White Sulphur Springs, W. Va., October 31, November 1 and 2. Ad-

vance registration and reservations indicate a record attendance from the porcelain enameling industry.

The first day of the program will be devoted largely to Institute business and planning for 1952, with

several important topics ranking high in member interest. A prominent economist will discuss the business outlook, and C. P. Lohman, chairman of the PEI New Uses Committee, will present "101 New Uses for Porcelain Enamel," a manual recently prepared by his committee.

Another subject of specific interest the first day will be a report by William Lescage, architectural authority, who will discuss the Institute-sponsored Porcelain Enamel Curtain Wall Research Project and the potential of the market it will create. A. L. Green, of the Association of American Railroads, will discuss the National Safe Transit Program, another Institute-sponsored project, and explain how it has contributed to the reduction of transit damages during its three years of operation.

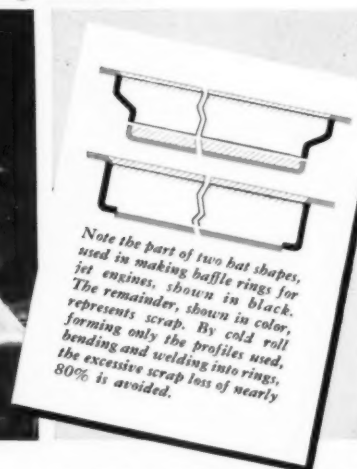
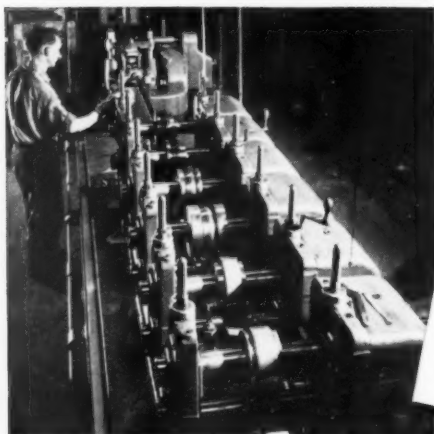
Division meetings and the famous Greenbrier recreational facilities are scheduled for the second day with special activities throughout the meetings for the wives. The annual banquet will climax this day's events.

Defense production is the featured subject of the final day of the three-day session and will be presided over by P. B. McBride, chairman, PEI Government Business Committee. The initial address of the Defense Forum will deal with the subject of obtaining government contracts. Opportunities for porcelain enamel applications in marine service also will be discussed, and another talk will deal with the values of the new high temperature porcelain enamels for aeronautical and other services. A concluding address by E. W. Dany, of the Government Business Committee, covering the use of porcelain enameling industry furnace capacity for defense work, will be followed by an open forum discussion moderated by P. B. McBride.

YOUNGSTOWN KITCHENS "TAKE OVER" SHERMAN ACRES

Complete units of Youngstown Kitchens, including electric dishwasher sinks, have been installed in a housing development of 338 modern 6-room houses at Sherman Acres, in San Francisco.

12 EXAMPLES OF ECONOMIES effected by combining different operations in a YODER Roll Forming Machine



No. 12. Up to 80% saving in material cost by cold-roll forming, avoiding former heavy scrap loss

Of all the methods available for cold-shaping flat rolled metal, the cold roll forming machine offers the highest production per man hour and the lowest conversion cost. It is often a good investment even when operated only a few days per month.

Of still greater importance than conversion cost is often the saving of weight which may be effected by designing light, strong box, tubular and other special structurals to take the place of hot rolled angles, channels, trees, etc. Material savings up to 50% are frequently made.

In press forming of hat shapes to make stator rings for jet engines, up to 80% of the metal has to be cut away and discarded

in order to obtain one ring. By cold roll forming the profile from strip, cutting to length, bending into rings and joining ends by welding, this huge scrap loss is avoided. Here is another example of how a Yoder cold Roll Forming production line may save scarce and expensive stainless steel, aluminum, brass and other metals. In such cases, the material savings alone may be many times greater than the conversion cost, even for relatively small quantities.

Function, scope, and economics as well as mechanics of cold roll forming, are discussed in Yoder's 86-page illustrated book which will be sent on request. Recommendations and estimates for the asking.

THE YODER COMPANY • 5559 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding



The development was constructed by McGah Organization who stated that installation of these units marks a definite trend on the part of builders to equip new houses with modern appliances such as stoves, refrigerators, dishwasher, and garbage disposers.

DEARBORN STOVE NAMES V. P.

Lee Van Brunt, general manager of the northern division of Dearborn Stove Co., with headquarters in Chicago, has been named a vice president of the firm.

DEFENSE MOBILIZER TO HEAD CLOSING SESSION OF WORLD METALLURGICAL CONGRESS

Charles E. Wilson, Defense Mobilizer, has accepted the invitation of the American Society for Metals to be the major speaker at the closing session of the World Metallurgical Congress in Detroit, October 19.

William H. Eisenman, Society executive secretary, said that Mr. Wilson will speak on the strategic importance of world metal conservation and production to the interests of free world defense.

ELECTROCHEMICAL SOCIETY TO MEET OCTOBER 9-12

Theoretical and practical aspects of screen applications will be the subject of a round-table discussion, scheduled for the 100th meeting of The Electrochemical Society, October 9-12, Hotel Statler, Detroit. The session will be sponsored by the Society's electronics division.

Other divisions of the Society scheduling programs are: battery, corrosion, electro-deposition, electro-organic, electrothermic, and industrial electrolytic.

FERRO ADVANCES JANECKE

Joseph F. Jancke has been appointed manager of Ferro Corporation's New-Products Division.

Until his new appointment, he was Ferro's service manager. A graduate mechanical engineer from Tri-State College, Angola, Ind., Jancke joined Ferro in 1926. He is a specialist on problems of welding and design of porcelain enameled products.

MAHON MOVES LAST TWO DIVISIONS TO NEW PLANT

The structural steel and steel deck divisions of The R. C. Mahon Company, Detroit, which were the only divisions of the company remaining at the Mt. Elliott Avenue plant, have now completed movement to the company's new plant at 6565 East Eight Mile Road at Sherwood Avenue.

This move brings the entire Mahon operation, including general offices, into one location where the

company's eight divisions will occupy a plant covering some 57 acres when construction is completed.

The structural division will occupy new facilities involving over 400,000 square feet of floor space which will permit the division to more than double its fabricating capacity.

Other divisions of the company include: steel warehouse, steel-weld, industrial equipment, rolling steel door, insulated metal wall, steel deck, and roofing and sheet metal divisions.

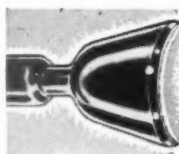
Think of what
99% EFFICIENCY
would mean in your own spray finishing department

Why, that's almost perfect, you'd say. Practically NO paint loss!

Hard to believe, isn't it? But it's a fact. The new RANSBURG No. 2 Electrostatic Process is making possible new efficiencies heretofore unheard of in the field of spray finishing. In many instances, efficiencies actually exceed 99%!

On most production lines, the RANSBURG No. 2 Process gives 25% to 75% more pieces per gallon than any other spray finishing system.

With the No. 2 Process there's NO overspray to be exhausted. NO compressed air used. NO operator skill required. And, practically all of the many uncontrolled factors in other systems have been eliminated.



Write for a copy of our brochure describing the No. 2 Process in more detail. Case histories of early installations are included in the brochure.

Electrostatic Painting Processes

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

WEST COAST ENAMELERS TECHNICAL PROGRAM, OCTOBER 26

The Pacific Coast Enamellers Club will hold a luncheon-meeting on October 26, at the Wilton Hotel, Long Beach, California, in conjunction with the 4th Pacific Coast Regional Meeting of the American Ceramic Society, October 24-26.

Presiding at the luncheon will be Howard R. Burlingame, Club president. Guest speaker will be J. E. "Jake" Eagle, of Pemco Corporation, Baltimore, Md.

Following the luncheon a technical program will be presented as follows:

1. "High Temperature Ceramic Coatings for Ingot Iron and Alloy Metals," by Howard Burlingame and Hyman Leggett, California Metal Enameling Co., Los Angeles.

2. "Sales Viewpoint of Production Problems," by W. E. Cranston, Norris-Thermador Corp., Los Angeles.

3. "How the Ceramic Industry Can

Help the Guided Missile Program," by Dr. Fritz Zwicky, Aerojet Engineering, Azusa, Calif.

4. "Spray Today," by Marcel Pouilly, The DeVilbiss Company, Chicago.

The regional meeting itself will open on the morning of October 24, with an address of welcome by Clark Sutherland, chairman, ACS Southern California Section, hosts of the meeting. He will introduce Howard R. Lillie, president of the American Ceramic Society, who will bring a message of greeting from the national organization. Keynote speaker on the first day's program will be "Jake" Eagle, of Pemco, who will discuss "Critical Materials Shortages."

ENTHONE NAMES GOODSELL AS MIDDLE WEST REP.

Robert B. Goodsell has been appointed sales and service representa-



tive in the middlewest for Enthone, Inc., of New Haven, Conn. His address will be in care of Ardco, Inc., 6665 So. Nashville Ave., Chicago.

Widely known for his activity in the American Electroplaters' Society, he has spent 24 years in the field of electroplating and metal finishes. Some companies for whom he has worked in various capacities as plating foreman, control chemist and finishing superintendent, include Greene Mfg. Co. and Racine Plating Co., both of Racine, Wis.; Moe-Bridges Lighting Corp., Milwaukee; A. Y. McDonald Mfg. Co., Dubuque, Iowa; Nash - Kelvinator Corp., Kenosha,

MACHINED

BRASS

- FORGINGS
- CASTINGS
- EXTRUSIONS

to customer specifications

For Defense Production or Essential Civilian Requirements

Detroit Brass is your answer whenever your components are to be produced from brass forgings, castings or extrusions. You are assured prompt production to meet your schedule requirements. Where close tolerances are demanded, where familiarity with government specifications is desirable, team up with Detroit Brass. Get the advantages of its fifty years' growth in brass experience.



Producers and Suppliers of material for: U. S. Army Ordnance • U. S. Navy • U. S. Army Air Corps • Maritime Commission and the following industries: Air Conditioning • Aircraft • Automotive • Beverage • Diesel Engine • Dry Cleaning • Farm Equipment • Gas Appliances • Locomotive • Oil Refining Equipment • Oil Heating Equipment • Plumbing • Refrigeration • Rubber • Spray Equipment • Washing Machine • and others.

DETROIT BRASS & MALLEABLE WORKS
Specialties Division • Detroit 9, Michigan

AT YOUR SERVICE IN THE NATIONAL EMERGENCY

Wis., and Camfield Mfg. Co., Grand Haven, Mich.

Goodsell will act as technical service representative and consultant for all of Enthone's products, including those for coloring and blackening of metals, stripping of synthetic enamels and other metal coatings, plating upon aluminum, and general products pertaining to cleaning and pickling.

"PETE" PETERSEN JOINS HUNTER-THOMAS ASSOCIATES

A message from W. B. Thomas, of Hunter-Thomas Associates, Cleveland, Ohio, business association management organization, announces the



addition to the company's staff, as an associate, of Frederick A. (Pete) Petersen.

Petersen is well known to the porcelain enameling industry in connection with his work as a research professor at the University of Illinois Department of Ceramic Engineering, where he has been on the faculty for the past ten years. He has been closely associated with the porcelain enamel industry, and was in charge of the research program for the Enameled Utensil Manufacturers Council. "Pete" is also on the National Safe Transit Committee. He is a graduate of the Engineering School of the University of Illinois, majoring in Ceramics, and has his Master's Degree.

In announcing the appointment, Thomas said, "We have known and worked with Mr. Petersen for nearly ten years, respect his ability, and believe he already has many qualifi-

cations for trade association work."

Finish wishes "Pete" success in his new activity.

SPRUCE HEADS DEVILBISS NEW SOUTHWEST DISTRICT

W. C. Spruce, direct factory representative of The DeVilbiss Company's spray painting and finishing equipment division, has been named southwest district manager, according to Henry M. Kidd, division sales
Industry News . . . to Page 93 →

Fabrication at Maytag

→ from Page 25

1/4" scale including scale wooden models of all equipment and with Plexiglas sidewalls and flooring.

A catwalk over this model plant gives executives and engineers an opportunity for a perfect view at any time. The three dimensional effect thus obtained leads to a quick change of perspective so that the effect of shifting or changing of equipment can be readily judged in advance.



"THEM REVENOORS SHORE BEEN NICE SINCE PAW CONVERTED TO PAINT THINNER FOR THEM VEDOC BOYS"

It wasn't so long ago that the raw material situation was just about this tough. But during that period of shortages, there was no change in the high quality of DEFENSE PAINT that came from Ferro's shipping docks.

Whether your orders were for gallons or drums, the formulation that made up your particular order never varied. You still got the best possible government specification finish, for your particular finishing operation.

When you bid on Defense Orders calling for specification finishes, remember the experience and production facilities that Ferro can offer, to make your finishing job the most efficient part of your production line.

FERRO

C O R P O R A T I O N

LIQUID PLASTICS DIVISION

4150 East 56th Street • Cleveland 5, Ohio



Medal of Honor



Sergeant Charles Turner, of Boston, Massachusetts—Medal of Honor, Korea. On September 1, 1950, near Yongsan, Korea, Sergeant Turner took over an exposed turret machine gun on a tank. Despite fifty direct hits on the tank, he stayed by his gun and destroyed seven enemy machine gun nests before he was killed.

You and your family are more secure today because of what Charles Turner did for you.

Sergeant Turner died to keep America free. Won't you see that America *stays* the land of peace and promise for which he gave his life? Defending the things he fought for is *your* job, too.

One important defense job you can do *right now* is to buy United States Defense* Bonds and buy them regularly. For it's your Defense Bonds that help keep America strong *within*. And out of America's inner strength can come power that guarantees security—for your country, for your family, for *you*.

Remember that when you're buying bonds for national defense, you're also building a personal reserve of cash savings. Remember, too, that if you don't save *regularly*, you generally don't save at all. Money you take

home usually is money spent. So sign up today in the Payroll Savings Plan where you work, or the Bond-A-Month Plan where you bank. For your country's security, and your own, buy U. S. Defense Bonds now!

****U.S. Savings Bonds are Defense Bonds - Buy them regularly!***



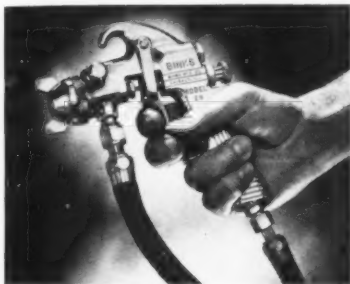
The U. S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America as a public service.

New Supplies and Equipment

J-10. New primer for finishing

A new primer for faster, better finishing of home appliances has been announced by a leading paint manufacturer. The primer is said to simplify application problems, with less than half ordinary film thickness providing more protection and greater coverage.

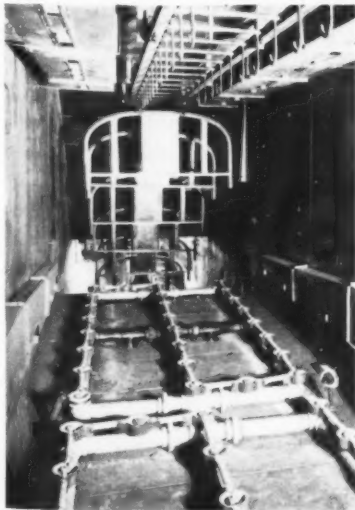
J-11. Lightweight spray gun



A lightweight spray gun that produces fine finishes has an aluminum casting body which reduces the weight of the gun to just 20 ounces. This lightweight feature is said to be especially valuable now, for defense work means more spray finishing operators will be women.

J-12. Radiant heat for burn-off

Using a gas-fired "radiant-heat" principle, a new process assures a metal product free from any oil.



More Information

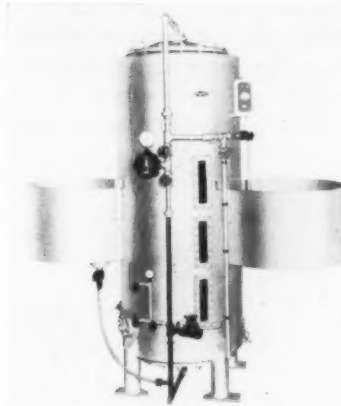
For more information on new supplies, equipment and literature reviewed here, fill out the order form on page 72, or write to us on your company stationery.

grease or other impurities in laps, seams, joints, corners and bends. The heating cycle of 5 to 8 minutes at 650° to 675° F. is said to result in a clean, dry surface which offers superior adhesion qualities for finishing.

In addition to removing surface film, the process is said to have the advantage of producing an excellent rust-inhibiting surface.

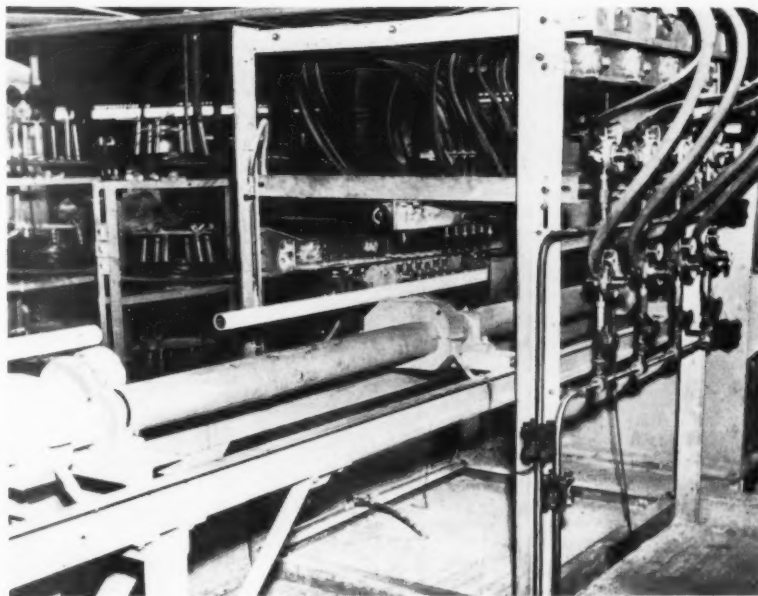
J-13. Mono-bed demineralizer

This new mono-bed demineralizer is said to operate upon the most effi-



cient and effective deionizing technique available to industry. Cation and exceptionally strong base anion exchangers are intimately mixed in a single unit tank, thus providing in one container the equivalent of a large number of "multiple bed systems." The raw water passes through this mono-bed column only once, yet comes out with a mineral content of virtually zero.

J-14. New automatic metallizing equipment



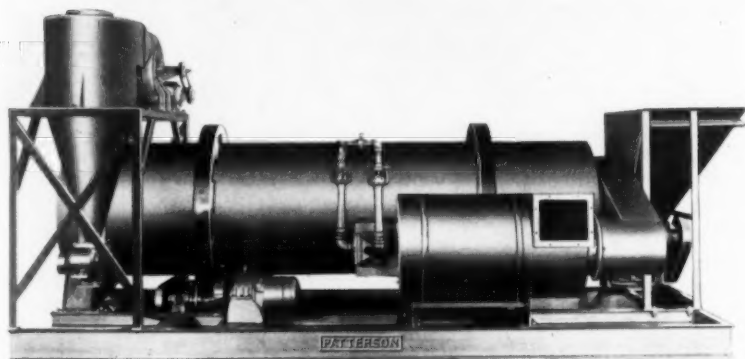
Designed and built in England for specific production applications, this fully automatic metallizing equipment is now available in this country. The illustration shows a section of one of several automatic units in daily use on varying applications. In this case, 2" diameter scaffold pipe is being blasted and metallized with pure

aluminum .004" thick at a speed of 1,200 lineal feet per hour. More than 40 feet long, this machine is so controlled that only two men are needed for its operation. Extremely low cost of operation results, in this instance, in a total cost (including labor, material and overhead) of less than 10¢ per square foot for both blasting and

metallizing. All ferrous and non-ferrous metals produced in wire form can be applied by metallizing to a

wide variety of products, including all metals, ceramics, carbon, and many plastic base materials.

J-15. Packaged unit for drying many products



A packaged drying unit has been placed on the market for the drying of chemical products, raw materials, synthetic compounds, and for use in many processes where the drying of expensive or delicate products is necessary. The unit consists of a rotary dryer with drive, screw feeder, air

heater, fan and dust collector integrally mounted on a steel frame. Materials to be dried are fed continuously by means of a special feeder directly to the sanitary interior of the dryer, and an uncontaminated, uniformly dried product is discharged continuously.

J-16. Automatic clamp attachment for industrial lift trucks



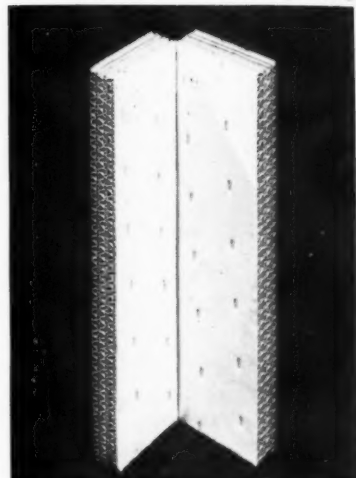
A new automatic clamp attachment for industrial lift trucks that tier refrigerators, ranges, washers and other similar crated and boxed products without the use of pallets, is now

available. Hydraulically operated, the new clamp handles two objects up to 75" high and 36" wide each, and stacks them 17 feet high simultaneously. The device was field test-

ed and installed on a 3000-pound capacity electric truck. This arrangement provided for two crates weighing up to 450 pounds each to be handled.

The truck is also equipped with a hydraulic side shifter which permits the load and clamp to be shifted four inches to either side of center. This permits close accurate spotting of the load saving space next to walls and between loads. The short length of the forks makes the truck and crate clamp ideal for loading freight cars. Here again, the side shifter permits use of space near walls.

J-17. Protective interior packing



A new type of protective interior packing is now available for use in protecting the finishes of refrigerators, ranges, washing machines, etc. during transit. The packing consists of thick outer corrugated pads which absorb shock, and a special inner facing which protects the finished exterior of appliances.

J-18. New flat sheathed electric heating element

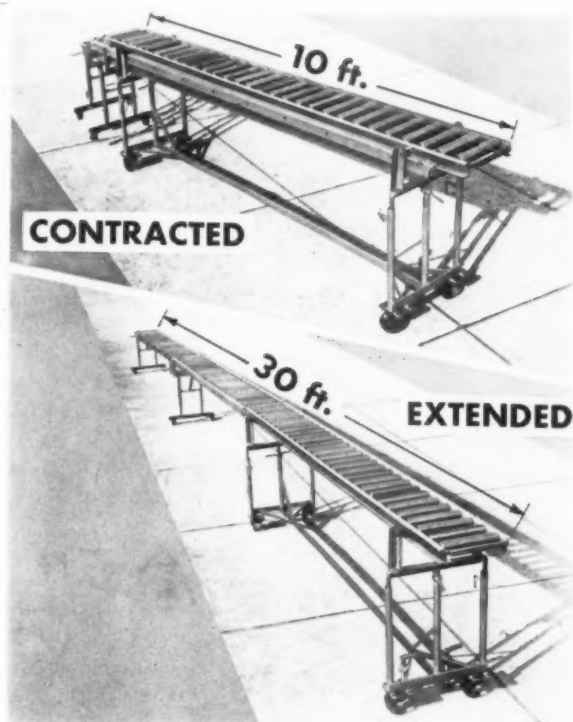
The manufacture of a new, very flat, sheathed electric heating element for industrial heating—such as is used with kettles, tanks, ovens, dies, driers and for immersion in liquids—has been announced.

The new type unit provides flat surfaces for contact heating and a thin section for convection and air flow. The 5/32" thick flat surfaces promote efficient radiation effects. They can be supplied with self-regu-

lating characteristics where their wattage will vary inversely with the heater temperature. Copper and steel

are standard sheath materials, although other alloys or plating and various coatings can be supplied.

J-19. Telescopic portable conveyor available with rollers



A new roller-type conveyor supplements the skate wheel type which is now widely used as a time-saver throughout industry. Recommended especially for conveying bundles and other objects not having a rigid flat bottom, the roller-type also carries a heavier load.

The roller-type is telescopic, easily "pulled-out" or "pushed-in" to follow the load for quick pick-up and delivery. Mounted on heavy casters, the unit is quickly and easily rolled from one job to another and instantly ready for action. Costly set-up time is eliminated, and adjustable break-lock holds conveyor securely in position.

On shipping platforms, the conveyor goes right into a truck, trailer or freight car so that carrying is reduced to a minimum. In storerooms, the unit may be used to save time and labor on short-distance transfers.

The roller-type is supplied in 12" and 18" widths. Nine different lengths are available which extend

to a maximum of 30 feet. The conveyors are all-steel. When extended, sections pull up even.

J-22. A new "safety-type" bridge ramp

A newly designed bridge ramp is scientifically designed, easily posi-

J-20. Ion exchange unit for treatment of water in heating plants

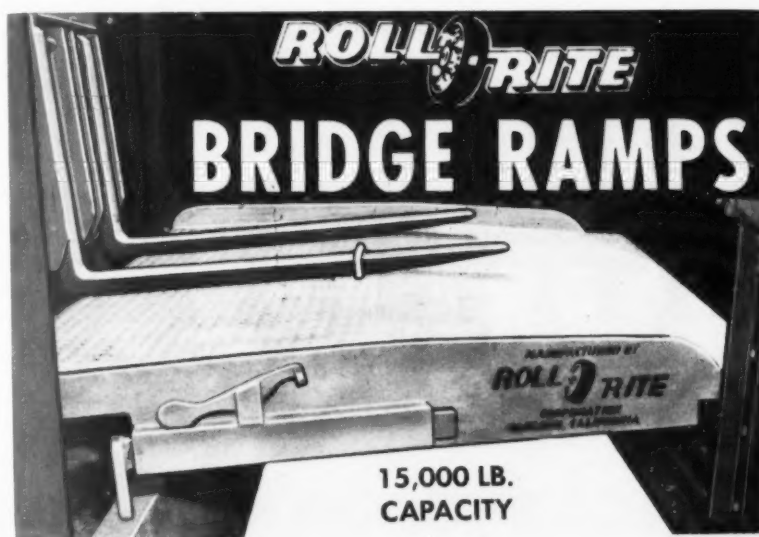
A new kind of ion exchange unit for the treatment of water in steam heating plants has been developed. To be known as the "dual bed" ion exchanger, the unit eliminates the need for much elaborate equipment and for handling such dangerous chemicals as caustic soda, sulphuric and hydrochloric acids during the regeneration process.

The new unit will find its principal application in industrial plants for the conditioning of boiler feed water where the prevention of scale formation and the reduction of condensate return line corrosion are major problems. An installation will consist basically of a single tank.

J-21. Evaporative cooler for quench oil cooling in heat treating

Systems which metalworking plants can use to increase quality and quantity in heat treating are outlined in a new bulletin on evaporative cooling of quench oils, published by a manufacturer of air conditioning, heating and ventilating equipment.

The bulletin tells how cooling and circulation of quench oils assures scientific control and saves time by continuous operation, in addition to reducing oil losses and fire hazards.



man handling, balanced control, easy placement. Once in position, a full range positive locking device prevents "creeping". The rough plate surface grips to fork lift tires and insures safe passage for men and equipment. Reinforced with truss and bottom braces, it is said to safely support up to 15,000 pounds without damage to the ramp.

Industrial literature

101. Book on paint arrestors



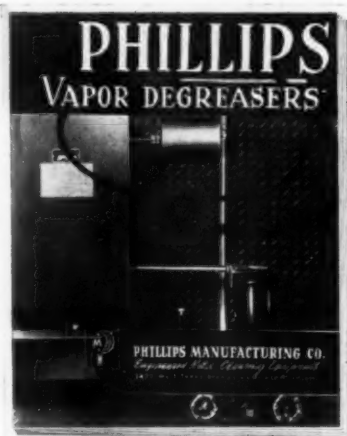
A booklet, "If You Spray Paint . . .", has been published by a manufacturer of air filters. In it are described the way that paint arrestors can be used to simplify the difficulties encountered in the installation and maintenance of spraying finishing

booths. Typical installations are described and illustrated.

102. Book on chemical and physical determinations in enamel plants

An 85-page book, entitled "Chemical and Physical Determinations in Porcelain Enamel Plants," by Mike Bozsai, is now available at \$3.00 per copy. The book is a complete revision of a series of articles published in "The Enamelist" in 1948-49.

103. Illustrated degreaser bulletin



A new illustrated bulletin describing a line of degreasing equipment gives a detailed picture of how degreasers operate, what types of manufacturing industries use degreasers, and to what specific applications vapor degreasers can be put.

104. Book on cold-roll forming

The function, scope and economics, as well as the mechanics of cold-

roll forming, are discussed in an 86-page illustrated book. In one instance, a saving up to 80% in material cost was made by cold-roll forming, avoiding former heavy scrap loss.

105. New spraying process

A new brochure contains information on a new electrostatic atomization and deposition method of spray painting. The brochure describes the process in detail, and includes case histories of early installations.

106. Industrial polishing booklet

A 12-page booklet, just published, describes modern techniques of industrial polishing and buffing as related to varied buffs, polishes and plating supplies. The booklet also serves as a catalog for one specific line of such products.

The booklet contains dozens of helpful technical tips on how to get better results and success in metal polishing operations. It defines and explains "cutting down" and "coloring" operations in the buffing process.

107. Preparing aluminum for welding.

"Five Things to Know about Preparing Aluminum for Spot Welding" is the title of a new booklet which gives authoritative, job-tested recommendations for performing the following operations: cleaning, de-oxidizing, rinsing, drying, and how to use the equipment involved.

108. Demineralizer catalog

A new four-page catalog gives detailed information with principal specifications and performance data on one line of demineralizer units for low-cost, chemically pure water. Besides a general description of the construction, installation, and operation of the demineralizers, the catalog explains the principle of demineralizers, gives suggestions for their use, and application for various manufacturing and chemical processes.

FINISH

360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No. _____	No. _____	No. _____	No. _____
No. _____	No. _____	No. _____	No. _____
Name _____		Title _____	
Company _____			
Company Address _____			
City _____		Zone _____	State _____



safe transit

FROM 25 YEARS TO 100% CUSTOMER

For Civilian or Defense Products

a low cost Collapsible Pallet Box

**Engineered to meet
your requirements**

check



Here's a money saver for in-plant storage and handling of materials and for outside shipments too. Its low initial cost will save thousands of dollars for plants using pallets in quantity.

check



The B-G Collapsible Wood Pallet Box is light in weight but built strongly enough to handle weights up to 5000 lbs. and is rugged enough to stand up under many repeated shipments.

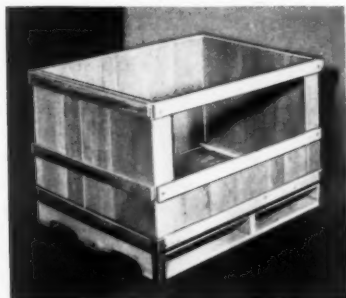
check



The collapsible feature is made possible by the exclusive Bigelow-Garvey **TIGHT CORNER** hinge design used on all of our collapsible wood shipping crates.

Used as a storage box, a tote box or as a shipping container, you will like this sturdy but inexpensive addition to effective materials handling.

MODEL B



always check



General Office and Laboratory

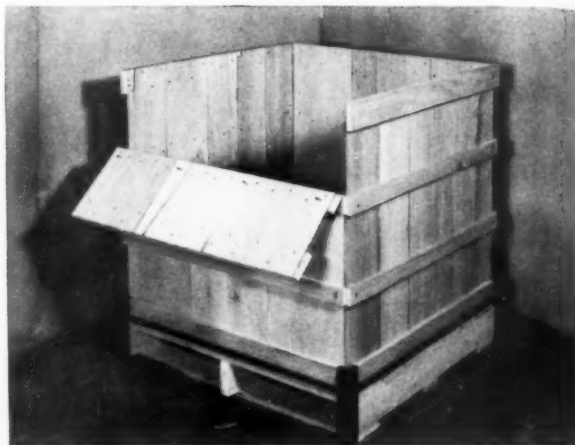
Write for complete details and prices to...

BIGELOW-GARVEY

lumber company

320 W. HURON STREET • CHICAGO 10, ILLINOIS

MODEL C



Standard Pallet Box attached to standard pallet by means of four corner irons and a single steel strap, showing the hinged drop leaf for easy access when pallet boxes are stacked or tiered.



Photo shows hinged box collapsed for storage or return shipment. Tops can be furnished if desired.

Photo shows front opening for easy access to contents when stacked one on top another or in racks. Furnished with or without self-locking insert panel.



Kraft
Crate



Tight Corner
Hinge Crate



Pallets



Pallet
Boxes



Wooden
Boxes



Six Section
Panel Crates

MILLS: ARKANSAS GEORGIA WISCONSIN MINNESOTA ILLINOIS

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and allied metal products field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

CONTENTS

HANDLING, PACKING, SHIPPING
AMERICAN-STANDARD PLUMBING
FIXTURES, HEATING EQUIPMENT .ST- 5

KRESKY TELLS DISTRIBUTORS
ABOUT SAFE TRANSIT PROGRAM ST-10

NEW INCLINE IMPACT TESTERST-12

NST CERTIFICATION FOR DEEPFREEZE,
HEINTZ, ING-RICH, DAY & NIGHT,
PAYNE FURNACE, DURA-CRATES..ST-14

18 NST LABORATORIES.....ST-14

SAFE TRANSIT LETTERSST-15

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DANA CHASE PUBLICATIONS

PRINTED IN U.S.A.



Final assembly and crating—puts the finishing touch on a new 48-inch cabinet sink at the Warren, Ohio, plant of Mullins Manufacturing Corporation. This new twin-bowl anniversary special sink is the latest addition to the line of Youngstown Kitchens products made by Mullins.

New incline impact tester—can be used to test containers up to 78" high. The new Conbur unit has just been completed at Package Research Laboratory, Rockaway, N. J. (story on page ST-12).



THE ONLY SOURCE *for* ALL THESE QUALITY BOXES *and* CRATES

**For Domestic or Export
For Peace or Defense**

Nailed

Hinge corner

Wirebound

Cleated Plywood or Cleated Cravenner

Cleated Corrugated

(Sectional, Hinged and Watkins Types)

Our designing and testing laboratory,
supervised by experienced engineers, can assist you with
your packing problems, and is at your service without
obligation.

A National Safe Transit Certified Laboratory

CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street

Chicago 3, Illinois

**Plants at: Helena, Arkansas
Tallulah, Louisiana**

**• Greenville, Mississippi
• South Fork, Colorado**

**• Rockmart, Georgia
• Chicago, Illinois**

Handling, packing, storing and shipping plumbing fixtures and heating equipment

how American-Standard has increased containers and materials handling efficiency, reduced labor cost factors, and delivered more finished products safely

PREPARED FOR FINISH AT THE PLANT OF AMERICAN RADIATOR & STANDARD SANITARY CORP., LOUISVILLE

finish

American Radiator & Standard Sanitary Corporation ships literally millions of packaged products. Not just one type of package but all sizes, shapes and descriptions. Enameled cast-iron bathtubs and sinks require strong wooden crates. Chrome-plated plumbing fittings are packed in quantity in wooden or fibre-board boxes. Vitreous china lavatories and water closets demand specially designed containers to prevent breakage. Cast-iron radiators, steel furnaces, boiler sections, water heaters and air conditioners in a wide range of weights and sizes each present a particular handling and packaging problem.

Similarly, the company employs many methods of transportation in getting its products to their destination. The packaging requirements of these carriers must also be met by the company. For example, Rule 41 of the Consolidated Freight Classifications defines the weights and dimensions of fibre-board containers. Again, overseas shipments require specially constructed boxes.

Special division established

Over the years through the various departments and plants, there were continuous individual efforts to improve materials handling and packaging methods. In many cases significant advances had been made. However, it was logical to believe that even more rapid improvement would result from the consolidation and coordination of such activities in a

single specialized division of the company.

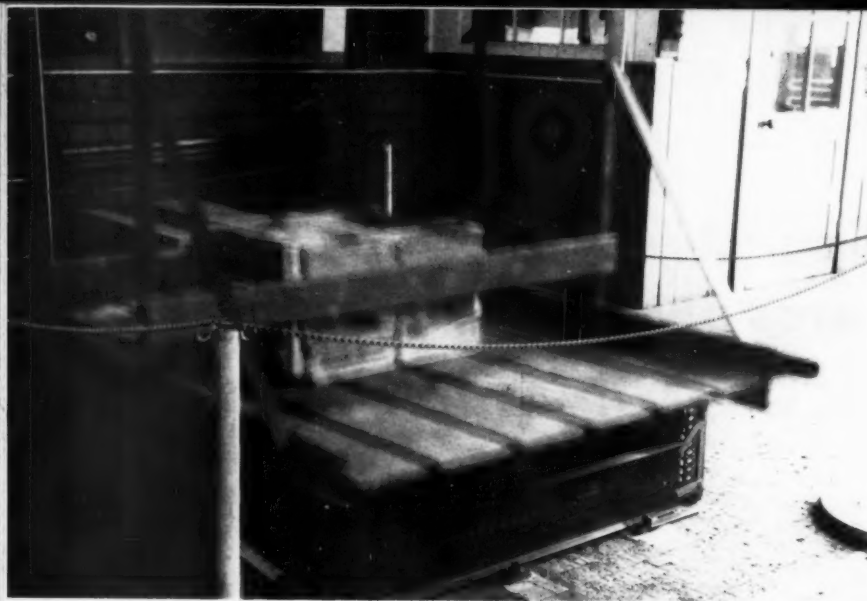
Accordingly, in early 1949, a Containers and Materials Handling Division was set up as part of the Manufacturing Department. Through its Test and Development Laboratory, at Louisville, the Division examines and makes recommendations concerning the materials, specifications and design of all containers used by Ameri-

can-Standard. Included in the definition of containers are such factors as packaging, packing, marking, preservation and packaging accessories and tools.

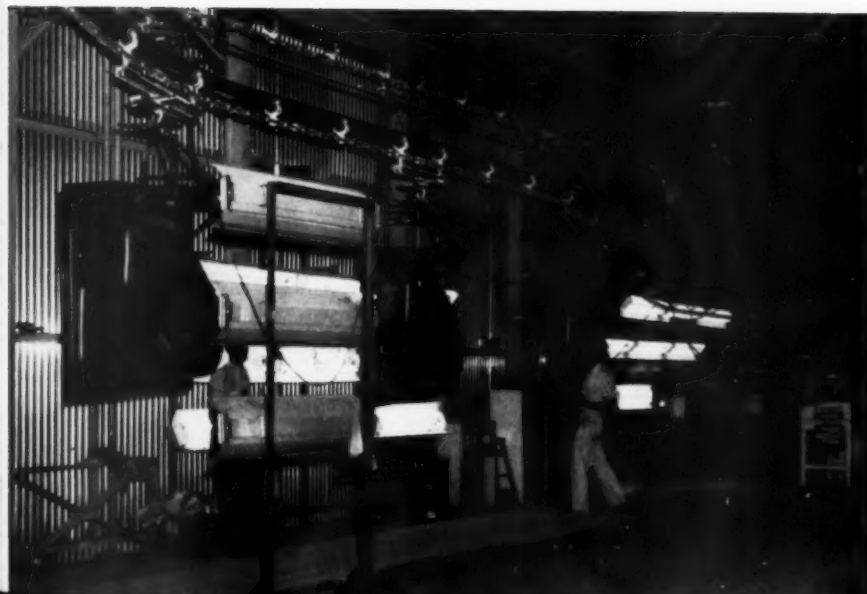
The Division also investigates materials handling matters such as palletizing and the palletized unit load, plant handling equipment, warehousing, carloading and bracing, and storage aids. It also examines ma-

Crating before and after: American-Standard sink at left, dressed up to go in its present container, has lost 39 pounds in weight and over three cubic feet in volume in comparison with the previous package shown at the right.





Left: The camera didn't move—the package does. This illustrates the rough treatment that a package receives during its long test rides on the vibrator.



materials handling equipment, determines proper specifications, and aids in equipment selection and design.

The services of the Division are available to all 16 plants of the parent company, American-Standard, and also, upon request, to its subsidiaries.

There are many challenging areas for Division research and development. Are the materials used in making containers the strongest, lightest, most economical? Do the packages take up the least possible amount of precious shipping space? In short, can container design be improved?

How about the packaging and warehousing of finished products? Can space, time and labor, hence money, be saved for the company and its customers by the use of mechanized materials handling equipment? By palletized storage? By rerouting product flow? Is any one method of transportation preferable to insure the arrival of products in good condition?

Performance standards for containers

Let's see what the Containers and Materials Handling Division does to find out if a container can take it. In general, containers must meet the performance standards of the American Society for Testing Materials. Fibre-board has to meet the requirements set up by the Technical Association of the Pulp and Paper Institute and other testing agencies. For wood used in containers, the recom-

Left center: Completing a run down the impact tester. Every angle is tested in the series of shocking rides each container undergoes. Performance records are maintained, and the best container wins.

Left: No lift, no tug, no haul. American-Standard bathtubs on overhead conveyors go through final inspection at the Louisville plant.

Right: Packaging without strain. The automatic turning device positions the next package for the application of steel straps by the machine shown at the right.



mendations of the Forest Products Laboratory of the U.S. Department of Agriculture are applied.

One of the most interesting laboratory tests is the measurement of the moisture content of the wood for crates and boxes. Obviously, green wood, in addition to its tendency to warp and crack under strain, adds significantly to shipping weight.

The Division's Laboratory is not satisfied with selecting proper material or creating what should be an improved design. It still wants to know what will happen to it after it leaves the plant. So packages are subjected to hours-long rides on a vibrator that simulates rough travel conditions. A drop tester and a Conbur impact tester determine the ability of the container to withstand rough handling. In the Conbur test, the container slides six feet down a sloping ramp at a 10° angle into a solid planking. This happens to the container not once, but top first, left side first, etc.

After satisfactory test performances, the container is road-tested. Shipment is made to another American-Standard plant with request that it be returned by some other method of transportation.

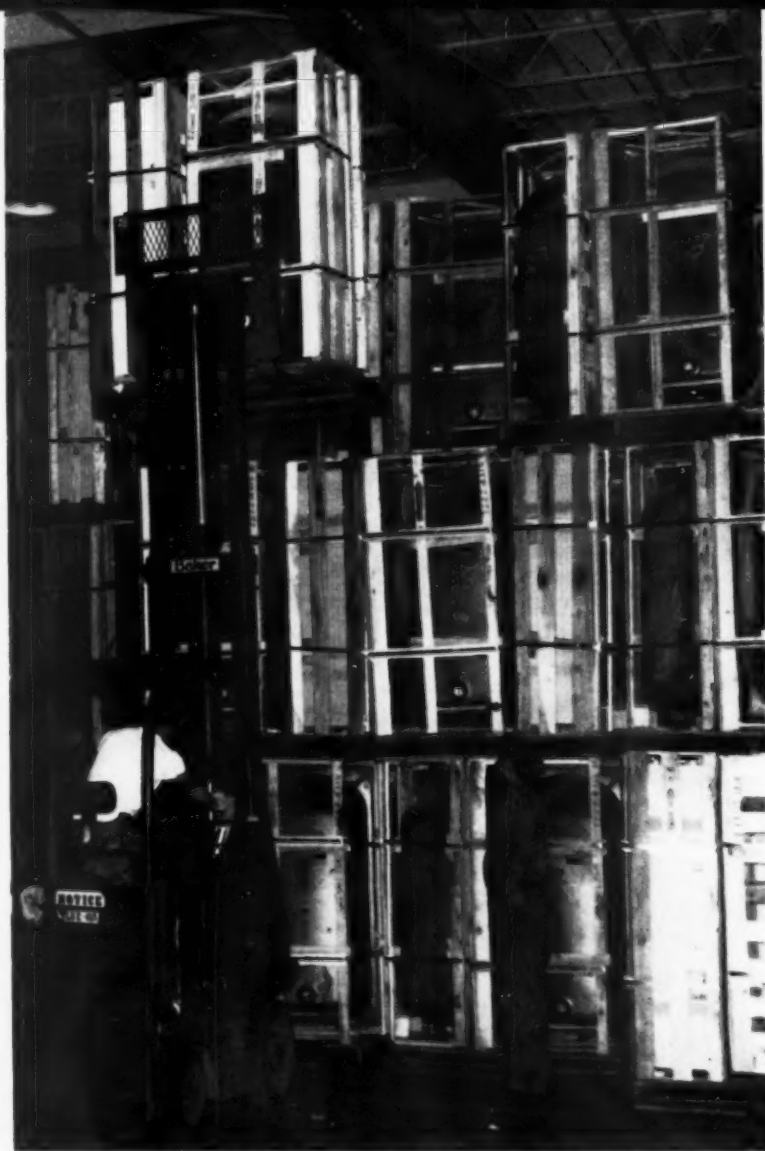
Occasionally, an impact recorder is shipped in a boxcar to determine handling shocks and where they happened. A time-recording device within the impact recorder makes this possible. A fact uncovered by these tests is that *rough handling by human*



Right center: Crating completed, a mechanical up-ender places the bathtub in position for the overhead hoist.

Right: Overhead hoist takes the heavy work out of positioning the crated bathtub on the pallet. Mechanical pallet loading is not possible because of the wide variety of products packaged.





A pallet load of crated bathtubs goes up to the top tier for storage, pending shipping. Transfer of loaded pallets to the storage area is accomplished with the aid of tractor trains.

hands is as often responsible for more product damage than shocks in transit.

As one example of what container improvements have done for American-Standard, take the case of the Royal Hostess Sink. The sink and crate formerly weighed 349 pounds, now it weighs 310 pounds—saving 39 pounds. The new package has a volume of 3.4 cubic feet less than the old. The cost per new container is 89¢ less—this has meant a substantial savings in containers for one product alone.

Take a look at some of the before-and-after methods of handling finished bathtubs as further evidence of what can be accomplished. A fin-

ished bathtub was formerly placed on a specially designed hand truck, inspected while on the truck, and then wheeled over to the crating area.

At the crating area, it was taken off the truck by hand and placed in an open crate. After crating, it was taken to the storage area by hand truck where it became a part of a stack built piece by piece. Transfer from storage to the loading area was again accomplished by moving individual tubs on hand trucks.

Conveyors, mechanical gadgets, pallets and lift trucks simplify handling

It's different now. An overhead conveyor carries the tub to and

through inspection to the crating area. There it is transferred by tilting onto a roller conveyor that carries it through the crating process. Steel strapping to strengthen the crate is applied by a power-operated, fully automatic machine. A mechanical up-ender in this conveyor line takes care of the lifting problem in crating. An overhead hoist helps in placing crated tubs on correctly designed pallets. Tractor trains now take the pallets to the storage area.

In the storage area, fork-lift trucks take the pallet from the tractor trains and place the pallet in position in a first, second or third tier. Far greater utilization of storage area is possible, and what was formerly a human lifting effort is now accomplished by the fork-lift. Entire pallet loads are now transferred to the loading area by fork-lift truck or tractor train.

One American-Standard plant superintendent points out that material handling labor has been cut markedly, primarily by shifting to fork-lift trucks. Palletizing and stacking loads is also an important factor in these savings.

Carloading practice improved

Procedures to insure greater safety in transit have also been set up. Car bracing has been improved, especially through the use of steel strapping. Gates are tailor made, and better techniques are employed in loading.

The Containers and Materials Handling Division has yet to answer all the questions. Each of the Company's plants has its particular packaging and material handling problems and the Division has not completed its studies and recommendations for all of them. There is a general feeling that it has only scratched the surface of the potential savings in money, manpower, and material.

But the Division has already become a significant factor in American-Standard operations. It has shown that handling, packaging, and shipping are not inflexible overhead, and that *improved performance does not necessarily mean added expense*. These areas are an industrial frontier for further research and development.

Now, more than ever before...

YOU NEED THE PROTECTION OF WIREBOUND BOXES and CRATES

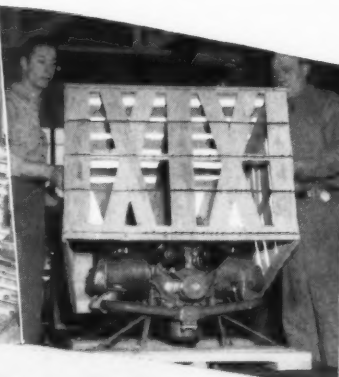
Losses due to container failure have no place in an industrial economy facing material allocations and shortages. That's why you should investigate *Wirebounds*—which combine the strength of steel with thinner wood to bring you better product protection at lower cost. Three hundred graduate engineers of the Wire-

bound Institute have been technically trained to design tailor-made *Wirebounds* which assure damage-free product delivery. The value of this container engineering is clearly demonstrated in the following case histories. We will be glad to show you how these benefits apply to your product. Use the coupon below.

YOU CAN CUT DAMAGE CLAIMS LIKE THIS:



Upside-down loading of circuit reclosers caused breakage, leakage, sometimes irreparable damage in handling and transit. Since switching to Wirebounds, company reports damage claims have become negligible.



Using Wirebounds designed to "float" 400 lb. precision engines, this manufacturer chalked up a record of 3000 shipments in fifteen months without a single instance of damage in transit due to container failure.



Flexible power saw maker reduced shipping weight from 820 to 775 pounds, cut crating time 30%. Company stocks and handles units four high. Shipping damage due to container failure has been completely eliminated.

choose your course of action...

- ☐ Send me general information... complete descriptive book titled "What to Expect from Wirebounds."
- ☐ Send me specific information... tear sheets of case histories of packing products similar to mine.
- ☐ Give me direct action send an Institute trained sales engineer to show the advantages of Wirebound packing for my own product.

NAME	POSITION		
FIRM			
STREET AND NUMBER			
CITY	ZONE	STATE	
OUR PRODUCT IS		IT WEIGHS	

mail now to WIREBOUND BOX MANUFACTURERS ASSOC.

Room 1154—327 South LaSalle Street, Chicago 4, Illinois

**Wirebound
BOXES & CRATES**

Users names on request

KRESKY MFG. TELLS DISTRIBUTORS ABOUT THE NATIONAL SAFE TRANSIT PROGRAM

Kresky Manufacturing Company, Inc., with general offices and factory at Petaluma, California, manufacture "Kresky" oil burning equipment. The company has been certified under the cooperative National Safe Transit Program, and is using the Safe Transit label and Safe Transit car card to publicize their participation.

In order that their distributor and dealer organization may be thoroughly familiar with the National Safe Transit Committee work and its benefit to dealers and distributors, B. Clyde Watts, Jr., chief engineer for Kresky, has sent a comprehensive letter to all Kresky distributors.

The text of the letter follows.

"As an endeavor to bring merchandise to you in the best possible condition, we have been working during the past many months with our crate manufacturers, Duff-California, and the testing laboratory of the wire-bound crate manufacturers, Package Research Laboratory, Rockaway, New Jersey.

"In 1950, an organization called the National Safe Transit Committee established standard tests for packaged equipment to simulate the treatment such packages would receive while in transit.

"The engineering portion of this Committee found that the handling of packages were such that very special tests must be devised if manufacturers were to insure safe delivery of merchandise to distributors.

"From the beginning, Kresky has worked with the crate manufacturers so that the crate construction and unit construction coordinated would make possible delivery of merchandise in the most salable condition.

"We are now proud to say that all of the Kresky floor furnaces and the wall furnaces have been tested by Package Research Laboratory and meet with the requirements of the National Safe Transit Committee.

"All future shipments of these units will have attached to the crate, a label showing that the unit does meet the standards of the National Safe Transit Committee. In addition, all carloads containing these units will be labeled on the outside with a placard showing that the items in the car have been pretested in accordance with the National Safe Transit Program.

"Your dealers will appreciate the care which Kresky is taking to make sure that Kresky heating units arrive in their hands in salable condition.

"To describe the National Safe Transit program to you, we are enclosing a booklet that shows the history of the program and how manufacturers, working with the Committee, are making their products easier to sell by the distributors and dealers."

This is one typical example of how Safe Transit certified companies are following through on the program after their packaged products have been properly tested and certified.

KIMBERLY-CLARK ANNOUNCES SALES APPOINTMENTS

A. G. Sharp, general sales manager, Kimberly-Clark Corporation, Neenah, Wisconsin, has announced the appointments of sales representatives for Kimpak protective cushioning and other industrial creped wadding products, as follows:

Raymond J. Miller, formerly of the market research division, has been assigned to a sales territory comprising most of Ohio and parts of Pennsylvania and West Virginia,

with headquarters in Cleveland.

William E. Cozens has been assigned to New York City; and Richard S. Pauli to Boston; with headquarters at the company's office in New York City.

Jacob O. Fritz has been assigned to St. Louis, with headquarters at the company's Atlanta Office, and William W. Stodghill has been assigned to Cincinnati, with headquarters in Chicago.



Left: William Stodghill

Left below: William Cozens

Right: Jacob O. Fritz

Right below: Richard Pauli

Below: Raymond J. Miller



SIGNODE TRANSFERS ELSINGER TO BALTIMORE DISTRICT

Signode Steel Strapping Company, Chicago, has announced that James R. Elsinger has been transferred from



Atlanta to the company's Baltimore district. He will reside in Richmond, servicing parts of Virginia and all of North Carolina.

It was stated that because of Elsinger's engineering experience, he is in a position to advise southeastern shippers on up-to-date methods of package protection, carloading and car bracing.

BRAINARD CLEVELAND MANAGER

John P. Stitt has been named district sales manager in Cleveland for Brainard Steel Company. He formerly was the company's representative

in the Buffalo district. Stitt's former post is being filled by James O. Tavenner, formerly in the company's main office in Warren, Ohio.

AMERICAN BOX APPOINTS CAPUTO SALES MANAGER

A. R. Caputo, formerly assistant sales manager for The American Box



Company, has been named to head the expanded sales department of the 50-year-old company, according to an announcement by George H. Kubes, president.

He started with the company in 1941 as a factory-hand, and worked up through the ranks as assistant foreman, foreman, order clerk, salesman, and assistant sales manager, helping to establish a record high in sales for the company this year.

MILLER HEADS PACKAGING COMMITTEE OF MARITIME ASSOCIATION OF N.Y.

The Packaging Committee of The Maritime Association of the Port of New York has been reconstituted with the same membership as the original committee, with R. Bruce Miller succeeding James B. Young as chairman.

Miller is assistant vice president of Insurance Company of North America, Philadelphia. He held the rank of Commander U.S.N.R. during the last war, and served in the office of Port Director, New York.

The committee is sending a questionnaire to steamship companies and insurance companies requesting information as to claims trends with

To Page ST-14 →

50 YEARS OF BETTER BOXES—"THE American WAY"



—including the *Kitchen Sink!*

American Wirebound Crate offers "full floating" protection, pays big "shipping bonus" to sink manufacturer.

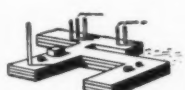
Hundreds of dollars are saved by a single crate redesign at American! Here's what happened.

First, the manufacturer of this sink supervised the designing of a wirebound crate to the most exacting specifications. It was modern, well-made. Then, American wirebound engineers redesigned it! The result: a new, better crate which passed all Safe Transit Tests, yet is lighter weight, saves storage space and assembles quicker, easier. "Full floating" protection "cradles" the sink—guards it against all handling hazards. Thus, American saved this customer plenty in overall packing, shipping, handling and miscellaneous costs.

If you have a "shipping bonus" due you, American can find it for you with better shipping containers. Inquire now!

Timber Tracts and Two Great Plants (Est. 1901)

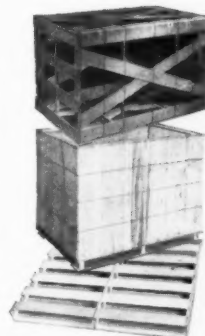
Over 5000 acres company-owned timber supplying veneers to plants conveniently located in Cleveland, Ohio, and Marion, South Carolina.



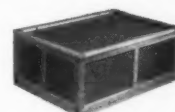
THE American BOX CO.

1902 W. 3RD ST.
CLEVELAND 13, OHIO

MARION,
SOUTH CAROLINA



American Wirebound Crate,
Tote Box, Pallet



American Fibreboard Box



American Nailed Wood Box

New incline impact testing device

describing Conbur testing device just completed at Package Research Laboratory

A NEW incline impact (Conbur) testing device has been completed at Package Research Laboratory, Rockaway, New Jersey, to replace one used in testing a great variety of packaged articles for the past 14 years. The original apparatus was one of the first ever used.

Will accommodate loads up to 1000 pounds

This new testing device accommodates loads up to 1000 pounds, and packages up to 78 inches high or 76 inches wide. The "bumper" is constructed of steel channels, oak boards, and a steel face plate. The dolly, 60 x 72 inches, is faced with maple boards, and is mounted on 6 roller bearing wheels which run on two steel tracks spaced approximately 33 inches apart. Although it is possible to release the dolly from as far as

13 feet from the bumper, a 5th zone shock may be obtained from a run as short as 23 inches. A 1000-pound hoist is located over the dolly to facilitate the handling of heavy loads for testing.

Testing device may be operated by one person

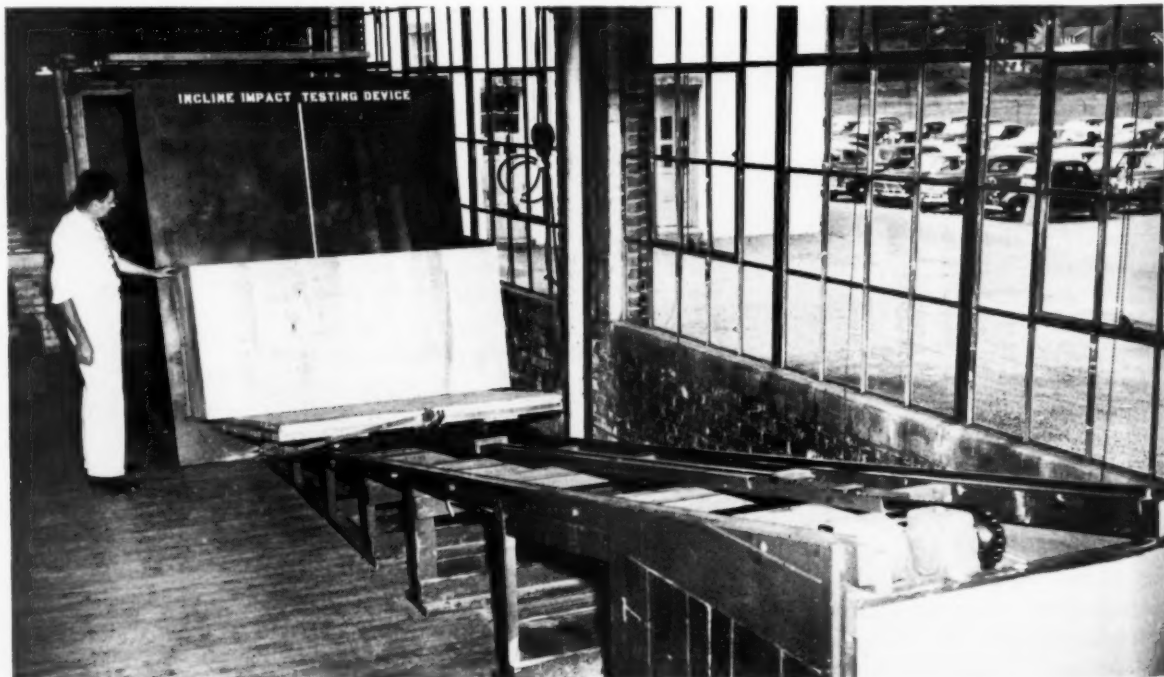
One of the big advantages of this new testing device is that it is now a one-man operation. The dolly is provided with a latch to engage one of the many lugs on a central chain. When not engaged, the latch is held clear of the chain by a spring. The operator starts the chain at the beginning of the test and does not stop it until the test is completed. A release is positioned in the middle of the track to automatically disengage the latch when the dolly has reached a pre-determined position.

The incline impact test is used for the prescribed test of the National Safe Transit Committee, and is a standard of the American Society for Testing Materials, and the Technical Association of the Pulp and Paper Industry.

This is one of a series of articles describing equipment used for "Safe Transit" testing.

The new impact tester described was designed by E. H. Hewson, assistant director, Package Research Laboratory. The director of the Laboratory is Earl R. Stivers, long-time secretary of Committee D-10 on shipping containers, ASTM; director, Eastern Division of Society of Industrial Packaging and Materials Handling Engineers; and a member of the Container Testing Committee of TAPPI.

On the new Conbur incline impact testing device just completed at Package Research Laboratory, containers as wide as 76 inches, and as high as 78 inches, can be released from as far as 13 feet from the steel and oak bumper.

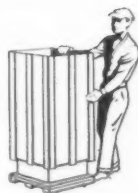


Finished Products ship better in a **WATKINS CONTAINER**



◀ **STACKING** Vertical wood cleats provide exceptional supporting strength to carry heavy loads. Typical crate supports 4 tons.

▶ **QUICK** Assembly line packing is speeded up. Easy to handle. Complete protection for your product.



◀ **STRONG** All wood cleats securely glued to tube-mat. Laboratory tests prove glued cleats resist weave and distortion better.

▶ **STORING** Containers are delivered flat (only 3 sections) and closely nested to conserve storage space.



**THERE IS A
WATKINS
CONTAINER
MADE NEAR YOU**

A Watkins Container provides greater strength, lighter weight, complete product protection, reduced assembly time—and—the "Traveling Billboard" feature.

Scientific design affords strength out of proportion to container weight: strength to carry your product safely . . . strength for stacking to any practical height . . . strength to resist weaving and shock without distortion.

Light in weight, the Watkins Container is quickly and easily assembled to completely enclose your finished product, saving labor . . . saving time . . . saving expense. The container arrives at your plant 75% assembled.

You get complete product protection: protection from outside dirt and dust . . . protection inside for fine product finishes—smooth interior with no staples or rough surfaces to damage the product.

Add to these advantages the "Traveling Billboard" feature (advertising can be printed in two colors on four sides) and you will see why more and more manufacturers of appliances and other valuable finished products are shipping the "Watkins way".

These companies build **WATKINS** containers

CORNELL PAPERBOARD PRODUCTS CO.	1514 E. Thomas Ave., Milwaukee, Wis.
COZIER CONTAINER CORP.	446 East 131st Street, Cleveland, Ohio
CRATE-RITE MFG. CORP., Division of Pacific Ports Ind. Inc.	10901 Russet Street, Oakland, California
DURA-CRATES, INC.	940 East Michigan Street, Indianapolis, Indiana
GENERAL BOX CO., 500 N. Dearborn St., Chicago, Illinois, and 16th and Maple Sts., Louisville, Kentucky	Watseka, Illinois
HEMB & MARTIN MFG. CO.	811 Center Street, Plainfield, Illinois
ILLINOIS BOX & CRATE CO.	1715 West Canal Street, Milwaukee, Wisconsin
KIECKHEFER BOX & LUMBER CO.	10212 Denton Road, Dallas, Texas
LANE CONTAINER CORP.	243 Singer Street, Lewisburg, Ohio
LEWISBURG CONTAINER CO.	608 South Commerce Street, Wichita, Kansas
LOVE MFG., INC.	

—an inquiry to any of these companies will get prompt attention—



The · WATKINS CONTAINER · Manufacturers

→ from Page ST-11

the object of determining those problems of cargo loss prevention that appear most worthy of study by the group.

The committee is also inviting carriers and underwriters to suggest any special problems coming within the scope of the Packaging Committee with respect to both imports and exports. It also is planning to invite shipper trade associations to cooperate with the Packaging Committee

and to submit packaging or related problems with such trade associa-

tions as are currently working on and desire assistance of the committee.

SAFE TRANSIT COMMITTEE CERTIFIES SIX MORE COMPANIES

Deepfreeze, Heintz, Ing-Rich, Day & Night, Payne Furnace and Dura-Crates are added Safe Transit certifications

Five additional manufacturers of appliances and allied metal products and one laboratory have been certified by the National Safe Transit Committee. This brings the total of

company certifications to 38, and laboratory certifications to 18.

The newly certified manufacturers are: Deepfreeze Appliance Division, Motor Products Corp., North Chicago, Ill.; Heintz Manufacturing Co., Philadelphia, Pa.; Ingram-Richardson, Inc., Frankfort, Ind., and the Day & Night and Payne Furnace Divisions of Affiliated Gas Equipment, Inc., both of Monrovia, California.

The newly certified laboratory is Dura-Crates, Inc., Indianapolis, Ind.

18 SAFE TRANSIT LABORATORIES

The following 18 testing laboratories have been certified by the National Safe Transit Committee.

American Gas Associations Labs.

Los Angeles, California

Atlas Plywood Corporation

Lawrence, Massachusetts

Chicago Mill and Lumber Company
Chicago, Illinois

Container Laboratories, Inc. (2)
Chicago and New York City

Cozier Container Corporation
Cleveland, Ohio

Dura-Crates, Inc.
Indianapolis, Indiana

The Fairfield Paper & Container Co.
Baltimore, Ohio (project 1-a only)

General Box Company
Chicago, Illinois

The Hinde & Dauch Paper Company
Sandusky, Ohio

Inland Container Corporation
Indianapolis, Indiana

International Paper Company
Georgetown, South Carolina

Ohio Boxboard Company
Rittman, Ohio

Package Research Laboratory
Rockaway, New Jersey

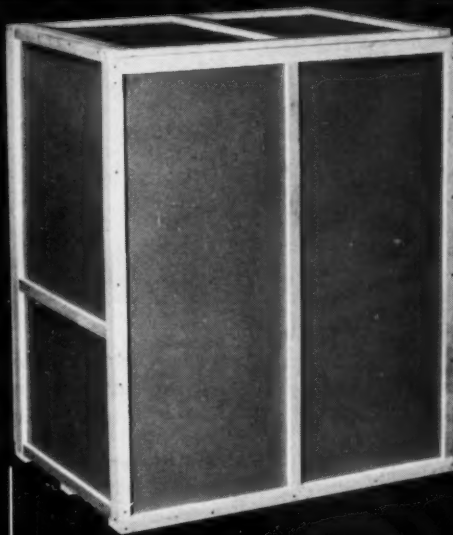
Packaging Service Corporation
Wyncote, Pennsylvania

The Don L. Quinn Company
Chicago, Illinois

Rathborne, Hair and Ridgway Box Co.
Chicago, Illinois

U. S. Testing Company, Inc.
Hoboken, New Jersey

**Cleated
Fibre
Shipping
Cases**



**FOR
Commercial
Shipments**

**FOR
Government
Shipments**

are safe, dirt-proof, strong — light in weight — comply fully with railroad and government requirements — present a clean, attractive exterior that lends itself well to advertising your product.

Cornell Cleated Fibre Cases are made at our Milwaukee Plant in many styles and sizes. We invite your inquiries for Cleated Corrugated or Cleated Solid Fibre Cases.

They comply with Government Specifications Jan-P-103 and NN-B-591.



CORNELL

PAPERBOARD PRODUCTS CO.

MILWAUKEE 1, WISCONSIN

SPECIALTY PAPERBOARDS, FOLDING CARTONS, CORRUGATED BOXES,
SOLID FIBRE BOXES, CLEATED FIBRE CASES, FIBRE WALL BOARDS

SAFE TRANSIT LETTERS

Shipping procedure pamphlets To NST Committee:

For the excellent material you sent the other day on packaging testing procedures, I will send you my best thanks.

The situation here in Sweden is that we have no testing laboratory for crates, packages, and so on, at all in the whole country. Personally, I am making hard propaganda on the people concerned with the problem to get them interested in the scientific testing methods described in the pamphlet you sent. If you have a chance to send further literature that you might publish, I would indeed be still more thankful.

Per E. Gierow

Assistant to the President

Jonkopings Mekaniska Werkstads AB
Jonkoping, Sweden

ATA extends appreciation on NST presentation

To NST Committee:

On behalf of the National Freight Claim Council of the American Trucking Associations, Inc., I wish to extend to you our sincere and deep appreciation for the presentation of the National Safe Transit Program and demonstrations of pre-shipment testing procedures before our Shipper-Carrier-Receiver Claim Progress Meeting in Detroit.

This presentation and demonstration was exceedingly well prepared, and its reception was the highlight of our four-day meeting.

As you well recall, it was our privilege on this occasion to present to the general chairman of the NST Committee a Citation Plaque which we hope will to some extent serve to record and convey our appreciation for the services which your committee is rendering in effectively promoting shipper-carrier cooperation in reducing freight loss and damage and in promoting safe transportation.

It is our opinion that you have definitely shown the way to achieve
finish OCTOBER • 1951

the goal of safe transportation. At the outset, you have recognized that claim-free transportation requires a definite scientific program imposing duties upon both shipper and carrier. While others have given lip-service to this recognized principle, your group was the first to actually undertake the establishment of such a program on an industry-wide and nationwide basis. The benefits of such a program accrue both to the shipper

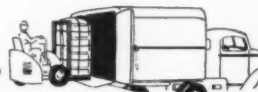
and to the carrier and this your group has conclusively established, and we hope that in the future others will be encouraged to undertake similar programs.

John M. Miller

Secretary

National Freight Claim Council
American Trucking Associations, Inc.
Washington, D. C.

FROM YOUR PLANT . . .



TO YOUR CUSTOMER . . .



A. J. GERRARD STRAPPING & TOOLS

PROTECT YOUR PRODUCT
PREVENT DAMAGE CLAIMS
PARE DOWN COSTS

FIBER-and-STEEL Strap



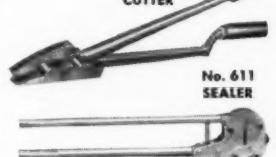
Protects Fine Finishes
Its soft Kraft paper outer layer won't scuff or damage the finest enamel finish. Inner layer of steel strap defies shipping shocks.

BULKBINDER Strap and Tools Brace and Protect in Car, Truck or Ship

No. 603
STRETCHER



No. 530
CUTTER



No. 611
SEALER



The Stretcher pulls $\frac{3}{4}$ " or $1\frac{1}{4}$ " wide strap taut, and the Sealer applies the seal. The Cutter quickly and easily severs new strap from reel, or excess strap after tightening. It also removes and salvages strap from incoming crates.

THE LOW COST LINE! . . . You buy all A. J. Gerrard strapping tools outright. No leases, no rentals, no added expenses.

THE COMPLETE LINE! . . . BULKBINDER line for heavy duty strapping.
STEELBINDER line for general strapping.

Consult your classified phone directory
for your A. J. Gerrard dealer or write



A. J. Gerrard & Co.

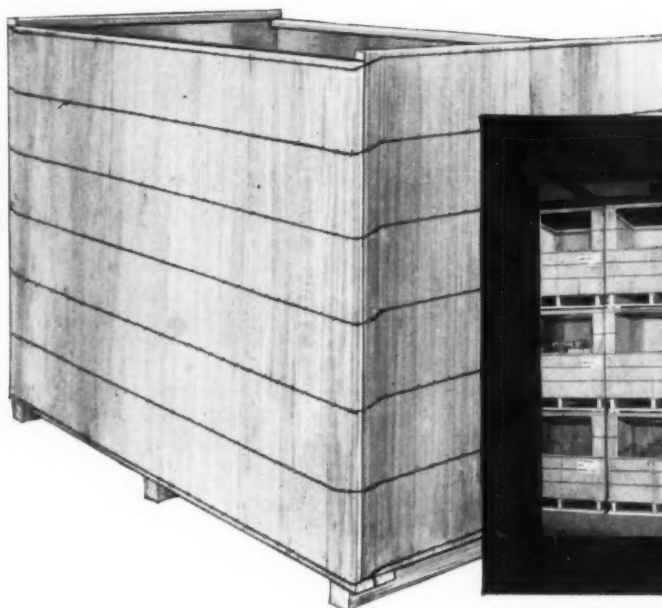
1958 Hawthorne Place • Melrose Park, Ill. (Chicago Suburb)



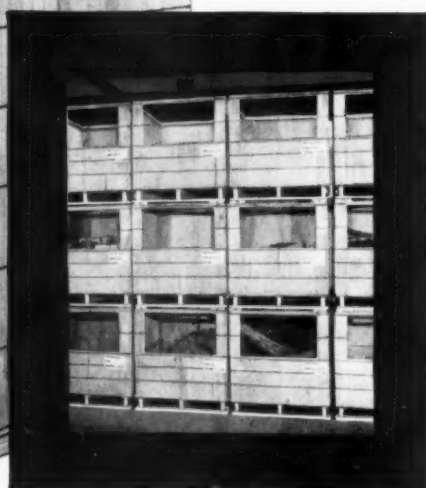
Generalift

★ ★ ★ ★ ★

pallet boxes



CUT MATERIALS HANDLING COSTS



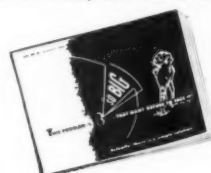
**REDUCE
STORAGE
COSTS**

- for large business
- for small business
- for ALL business

More and more manufacturers are helping solve their materials handling problems and storage problems with Generalift Pallet Boxes. It's the versatile container that sharply cuts costs . . . and helps step up production . . . because ONE workman, fork-lift truck, and Generalift Pallet Box do the work of many employees. Write us. We'll promptly provide full information on the Generalift Pallet Box, on ANY of our shipping containers.

WE WILL MAIL FREE COPY OF "THE GENERAL BOX"

This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.



General BOX COMPANY
engineered shipping containers
GENERAL OFFICES:
514 N. Dearborn Street, Chicago 10, Ill.

ALL TYPES OF
ENGINEERED SHIPPING CONTAINERS

DISTRICT OFFICES AND PLANTS:
Cincinnati, Denville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon, Continental Box Company, Inc.: Houston, Dallas, General Box Company of Mississippi, Meridian, Mississippi



ST-16

OCTOBER • 1951 finish

88 companies cooperating in Safe Transit program

THE following companies are certified under the National Safe Transit Program. They are privileged to use the N.S.T. Label.

Admiral Corporation
Chicago, Illinois
AllianceWare, Inc.
Alliance, Ohio
American Central Division
Avco Mfg. Corp.
Connersville, Indiana
American Stove Company
Cleveland, Ohio
American Stove Company
Lorain, Ohio
American Stove Company
St. Louis, Missouri
Andes Range & Furnace Corporation
Geneva, New York
Apex Electrical Manufacturing Co.
Cleveland, Ohio
Appliance Manufacturing Company
Alliance, Ohio
Automatic Washer Company
Newton, Iowa
The Bellaire Enamel Company
Bellaire, Ohio
Belmont Stamping & Enameling Co.
New Philadelphia, Ohio
Bendix Home Appliances
Division—Avco Mfg. Corp.
South Bend, Indiana
Boston Stove Foundry Company
Reading, Massachusetts
Caloric Stove Corporation
Topton, Pennsylvania
Canton Stamping & Enameling Co.
Canton, Ohio
Central Rubber & Steel Corporation
Findlay, Ohio
Chambers Corporation
Shelbyville, Indiana
Chicago Vitreous Enamel Prod. Co.
Cicero, Illinois
Conlon Bros. Mfg. Co.
Chicago, Illinois
Conlon-Moore Corporation
Chicago, Illinois
Cribben and Sexton Company
Chicago, Illinois
Crosley Division, Avco Mfg. Corp.
Richmond, Indiana
Crosley Division, Avco Mfg. Corp.
Nashville, Tennessee
Crunden Martin Manufacturing Co.
St. Louis, Missouri
Day & Night Division
Affiliated Gas Equipment, Inc.
Monrovia, California
Dearborn Stove Company
Chicago, Illinois

Deepfreeze Appliance Division
Motor Products Corporation
North Chicago, Illinois
The Dexter Company
Fairfield, Iowa
Dixie Foundry Company, Inc.
Cleveland, Tennessee
Duo-Therm Division
Motor Wheel Corporation
Lansing, Michigan
The Enamel Products Company
Cleveland, Ohio
Federal Enameling & Stamping Co.
Pittsburgh, Pennsylvania
The Fletcher Enamel Company
Dunbar, West Virginia
Florence Stove Company
Kankakee, Illinois
The Floyd-Wells Company
Royersford, Pennsylvania
General Electric Company
Erie, Pennsylvania
Globe American Corporation
Kokomo, Indiana
Hardwick Stove Company
Cleveland, Tennessee
Heintz Manufacturing Company
Philadelphia, Pennsylvania
Holland-Rieger Division
Apex Electrical Mfg. Co.
Sandusky, Ohio
Hotpoint, Inc.
Chicago, Illinois
Ingram-Richardson, Inc.
Frankfort, Indiana
International Harvester Company
Evansville, Indiana
Kaiser Metal Products, Inc.
Bristol, Pennsylvania
Kresky Manufacturing Co., Inc.
Petaluma, California
Kuehne Manufacturing Co.
Mattoon, Illinois
Landers, Frary & Clark
New Britain, Connecticut
A. J. Lindemann & Hoverson Co.
Milwaukee, Wisconsin
Lisk-Savory Corporation
Buffalo, New York
Majestic Manufacturing Co.
St. Louis, Missouri
Malleable Iron Range Company
Beaver Dam, Wisconsin
The Maytag Company
Newton, Iowa
Meadows Division, Thor Corporation
Bloomington, Illinois
Midwest Manufacturing Company
Division of Admiral Corp.
Galesburg, Illinois

Moffats, Limited
Weston, Ontario, Canada
The Moore Enameling & Mfg. Co.
West Lafayette, Ohio
Mt. Vernon Furnace & Mfg. Co.
Mt. Vernon, Illinois
Murray Corporation of America
Scranton, Pennsylvania
Murray Manufacturing Company
Murray, Kentucky
Nash-Kelvinator Corporation
Grand Rapids, Mich.
Nesco, Inc.
Milwaukee, Wisconsin
Newark Stove Company
Newark, Ohio
Norge Division, Borg-Warner Corp.
Effingham, Illinois
Norge Division, Borg-Warner Corp.
Herrin, Illinois
Norge Division, Borg-Warner Corp.
Muskegon Heights, Michigan
Odin Stove Manufacturing Co.
Erie, Pennsylvania
Payne Furnace Division
Affiliated Gas Equipment, Inc.
Monrovia, California
Perfection Stove Company
Cleveland, Ohio
Philco Corp., Refrigerator Division
Philadelphia, Pennsylvania
Prentiss-Wabers Products Co.
Wisconsin Rapids, Wisconsin
Ranney Refrigerator Company
Greenville, Michigan
Republic Stamping & Enameling Co.
Canton, Ohio
Geo. D. Roper Corporation
Rockford, Illinois
Milton Roy Company
Philadelphia, Pennsylvania
Seeger Refrigerator Co.
Evansville, Indiana
Seeger Refrigerator Co.
St. Paul, Minnesota
Serval, Inc.
Evansville, Indiana
A. O. Smith Corporation
Kankakee, Illinois
Speed Queen Corp., Ironer Division
Algonquin, Illinois
The Tappan Stove Company
Mansfield, Ohio
Temco, Inc.
Nashville, Tennessee
Thor Corporation
Chicago, Illinois
United States Stamping Company
Moundsville, West Virginia
Westinghouse Electric Corporation
East Springfield, Mass.
Westinghouse Electric Corporation
Mansfield, Ohio
S. S. White Dental Mfg. Co.
Staten Island, New York
York Corporation
York, Pennsylvania

New ceramic coating for jet engine parts

(Continued from Page 29)



Research director Long, left, with Don Krosch, superintendent of Solar-amic manufacture, examine a laboratory sample of one of the more than 200 frit modifications used in the new coating process.

10. Operating temperatures of the most heat resistant alloys now available can be increased by ceramic coating the part.

11. The coating can be used to cover all kinds of welds. It can be applied on a variety of metals and alloys in the same part. It adheres

to varying gauges or thickness within the same part.

12. Coatings are not affected by normal part distortion.

13. The coating stabilizes metal surfaces.

14. The possibility of using higher operating temperatures will increase jet engine efficiency.

Extremely light application weights

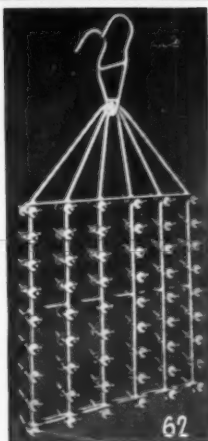
Most of the coatings now being applied range from 0.0005 to 0.002 inch in thickness. It will be noted that this results in a considerable saving in weight, a highly important factor in aircraft engine construction. While current uses of the new process are confined largely to jet engine components, tests are being conducted using coated parts in rockets, guided missiles, and many types of heat engines.

The potential civilian uses of the new coating material in its many variations are made obvious by its specialized characteristics. Many of these possible uses have already been tested on a laboratory scale. They include the coating of burners and

It's MISCO for HEAT RESISTING ALLOYS IN ROLLED MILL FORMS

Sheets — Plates — Rounds — Squares — Hexagons — Flats — Angles — Channels — Sections — Pipe — Nuts — Welding Rod

MAKE Your Enameling fixtures with MISCO METAL (35-15)
there is no finer Heat Resisting Alloy



STRONGER • ECONOMICAL • SCALE RESISTANT

ROLLED PRODUCTS DIVISION

Michigan Steel Casting Company

MISCO

1999 GUOIN ST. • DETROIT 7, MICH.
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

DEFENSE DIRECTOR VISITS HOTPOINT JET PLANT



Charles E. Wilson, center, Director of Defense Mobilization, with James Nance, right, Hotpoint president, and Fred Walters, Hotpoint v.p.-defense, viewing first production of combustion chambers and compressor cases for J-48 jets in Chicago.

flexible oven parts on household stoves, furnace parts of all types, many engine parts including truck, auto, and commercial aircraft, and innumerable industrial applications where a combination of flexibility, temperature resistance and chemical resistance are required in the same product.

Edmund T. Price, Solar president and general manager, warns however that the company is now swamped with military orders and cannot supply the new frit for civilian use until these conditions relax.

Solar Aircraft Company opened a new Solaramic process pilot plant in August this year. Engineers who have spent seven long years in developing and perfecting the new ceramic coating material are fully confident that even more uses will appear as experience is gained with its use.

A look into the future of enamel furnace design

→ from Page 35

fallen to the hearth. If this ware is removed immediately, costly jams and wrecks are eliminated.

Photo-electric lamps

Photo-electric lamps, though not entirely new to our industry's furnaces, will be mounted so as to project their beams the entire length of the furnace and blow a horn if the beam is broken by a piece of fallen ware. This has its greatest usefulness in furnaces firing objects such as bath tubs, refrigerator liners, wash machine tubs, and unit body range shells. Our earlier fears that the heat rays from the furnace hearth would distort this light beam are now dispelled. An interesting sidelight to this development is that many years ago a photo-beam manufacturer advised us that it couldn't be done. One of our braver furnace customers allowed us to install one and now is happy with the results.

Adapted for finish from a paper before the Central District Enamellers Club.

finish OCTOBER • 1951

for Clarification of NICKEL DIP SOLUTIONS NEUTRALIZING SOLUTIONS

Any Quantity

use an
**INDUSTRIAL
Filter**

100 to 15,000 gallons per hour.
Portable and stationary models.
Standard or special filtration
systems engineered to meet
unusual requirements.

**Dependable
clarification pays . . .**



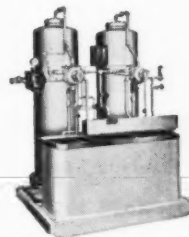
Here's how Industrial filters simplify clarification problems—The flow rates of Industrial filters are based on the actual solution involved. You know the capacity you get. In solution clarification there is more than just the filter. With Industrial you get an adequate filter with slurry tank, motor-driven pump, valves and fittings in a complete package with one, undivided, experienced responsibility—with space requirements at a minimum.

The labor, down time, and the inconveniences of cleaning, replacing the filter media, and reassembling the filter for every new filter cycle—all are eliminated by the Industrial Air-Wash Cleaning Method available for all models. It is necessary to remove the cover only when new filter cloths are installed. With Industrial filters, a clarified plating solution is always assured.

The engineering, design, and construction of Industrial filters have proved out in long service and low maintenance costs. Industrial has the experience and is large enough to handle your filter requirements. Since 1927 filters and filtration systems have been an important part of our business.

INDUSTRIAL Water Demineralizers

for Mill room assurance
that the slip is
always right



A Two-Bed INDUSTRIAL Water Demineralizer. Standard two-and four-bed units available with capacities of 200 to 1000 gph. Special units of any capacity engineered to requirements.

Write for full information
and recommendations

INDUSTRIAL FILTER & PUMP MFG. CO.

5906 Ogden Avenue
Chicago 50, Illinois

FILTERS PUMPS CORROSION TESTING APPARATUS
Pressure Type Centrifugal Salt Fog • Humidity

RUBBER DIVISION
Vulcanized Linings • Molded Products

WATER
DEMINERALIZERS

Turning the wheels of a national trade association (Continued from Page 39)

of Illinois at Urbana, Illinois. The prime purpose of this committee is to evaluate the technical developments within the industry and bring before the Forum meeting speakers who will present the best of such technical developments for the benefit of operating and technical personnel.

Curtain wall project

The so-called "Curtain Wall" re-

search and development project represents an example of a "special project" not included in the functions of the established committees. It may prove to be one of the most important and certainly one of the most extensive ever attempted by the Institute.

Reference is to the modern skyscraper construction method used by architects. Since this type of construction is adaptable to all types of

construction as well as multi-storied buildings, PEI foresees an approach to one of America's largest markets for porcelain enamel.

Consequently, all segments of the Institute have joined in a group effort to research and engineer a type of porcelain enameled curtain wall panel which will answer the numerous building codes and provide the industry with an entry into this growing field.

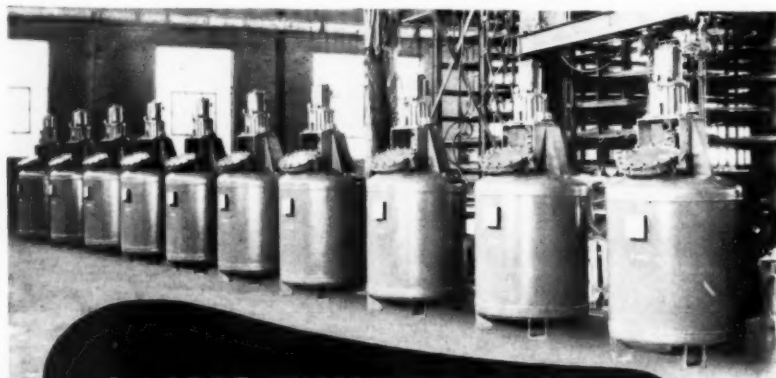
A very sizable research and development fund has been established especially to retain and employ a top flight architectural or engineering firm to accomplish the designing and engineering of this newly planned building product for the industry.

A board of experts has been established from the membership and these men have engaged a leading consulting engineering firm for the development and design work.

Large and small

companies benefit alike

All companies, large and small alike, are prone to be too busy doing business to pay more than passing attention to the trends occurring within the industry unless they directly and immediately affect business. On the contrary, national association organizations are staffed and implemented to work with existing industry problems for the benefit of all concerned. When this approach is followed actively and with organized, directed and inspired effort, results are achieved which could never be accomplished by any single firm. The small concerns get to mingle, pool and share knowledge and voting power with the giants of their industry. The giants get an opportunity to hear the small firm's side of the picture directly and adjust their own thinking accordingly. Objectives too big or too far flung to be accomplished by any single firm can readily be attacked through combined action. Resources, influence, information and national programs become the common property of large and small alike. Industry organizations like this are here to stay.



**A LARGE ENAMELING PLANT
USES 29 OF THESE PATTERSON
PRESSURE VESSELS
FOR SPRAYING OF
PORCELAIN ENAMEL**



● Stationary pressure vessels are rapidly replacing portable type tanks in the porcelain enamel industry. These 29 Patterson units deliver the milled frit to its point of application. Built of stainless clad steel and designed for 65 lbs. pressure, these Patterson vessels eliminate manual handling and reduce labor costs to a minimum. Write for details.

Richard L. Cannon
President

The Patterson Foundry and Machine Company
East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI,
CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE
The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

NEWS → from Page 67

manager. He will supervise sales activities in the company's newly created southwest district which includes Texas, Louisiana, Mississippi, Arkansas, Oklahoma, New Mexico, a section of western Tennessee and northwestern Alabama.

MACLAREN HEADS SUPERFEX SALES

Perfection Stove Company has announced the appointment of A. B. MacLaren as sales manager of its Superfex furnace division. He joined Perfection in 1930 in a sales and service capacity.

In 1935, MacLaren was named layout engineer and sales and service correspondent. During the war he had charge of Perfection's production engineering office and also handled contract terminations. He was named service manager when the war ended, and assistant sales manager of the furnace division in 1943.

NOVY ADVANCED BY CHI VIT

Otto Novy has been promoted to assistant director of research of the



development division of Chicago Vitreous Enamel Product Co., it was announced by William Hogenson, president.

Novy received his B.S. in Ceramic Engineering from the University of Illinois in 1941. He was then employed by National Tile Co., Anderson, Ind., as a research engineer working on clay bodies, insulators and glazes. In May, 1946, he joined

Chicago Vitreous, where he worked in various positions in control, special enamel problems, customer service and enamel development.

ERIE ELECTS TWO NEW V. P.

Two new vice presidencies have been created by the board of directors of The Erie Enameling Co., Erie, Pa.

According to Herbert R. Spencer, president, Robert E. Braggins, for-

merly plant superintendent, is now vice president-manufacturing, and Mark van der Kloet, former manager of architectural division, is now vice president of that division. Herbert R. Spencer, Jr. was named assistant treasurer.

BELLAIRE EXPORT MGR. DIES

The Bellaire Enamel Co., Bellaire, Ohio, has announced the death of Bernard Shapins, export manager, on

Why pay for
IRON SPOTS?
"Prevention is cheaper"
with the
FRANTZ FERROFILTER



On clean, iron-free enamel slips depend the sparkling enamel finishes that are so necessary for your finished products. Failure to eliminate iron contamination invariably costs you money—results in product rejections or lowering of grade.

YOU HAVE A CHOICE!

The electromagnetic pipe-line separator shown above fits into your dip tank circulating system and your liquid transfer system to supply you with the lowest cost finish insurance you can buy.

The Frantz FerroFilter offers the maximum in design simplicity, convenience, and real dollar saving economy that our experience as leading magnetic separator manufacturers has enabled us to put into it. The quality is backed by an unchallenged reputation and high performance records in leading plants all over the country.

Prove it for yourself! Have spoilage costs drop, production increase and rejects rare as a January heatwave—with the Frantz Electromagnetic FerroFilter.

Gravity type FerroFilters are available where a closed system is not required.

**For further information
send for Bulletin No. 54**



Enclosed pipe-line type FerroFilter sizes range from 1" to 3" IPS.

A FerroFilter grid. Magnified inset shows collected particles on grid edges.

S. G. FRANTZ CO., INC.

P.O. Box 1138

Trenton 6, New Jersey

1204

ADVERTISERS' INDEX

	PAGE
AMERICAN BOX COMPANY, THE.....	ST-11
AMERICAN CHEMICAL PAINT COMPANY.....	63
AMERICAN PORCELAIN ENAMEL COMPANY.....	16
ARMCO STEEL CORPORATION	1
ASHDEE PRODUCTS, INC.	12
BIGELOW-GARVEY LUMBER COMPANY.....	ST-2
BINKS MANUFACTURING COMPANY.....	17
CARBORUNDUM COMPANY, THE	31
CENTURY VITREOUS ENAMEL COMPANY.....	4
CERAMIC COLOR & CHEMICAL MFG. CO. ...	2nd COVER
CHICAGO MILL AND LUMBER COMPANY.....	ST-4
CORNELL PAPERBOARD PRODUCTS CO.	ST-14
DETROIT BRASS & MALLEABLE WORKS	66
ENTHONE, INCORPORATED	55
FERRO CORPORATION	4th COVER
FRANTZ COMPANY, INC., S. G.	93
GENERAL BOX COMPANY	ST-16
GERRARD & COMPANY, A. J.	ST-15
HARSHAW CHEMICAL COMPANY, THE.....	2
HOMMEL COMPANY, THE O.	30
INDUSTRIAL FILTER & PUMP MFG. CO.	91
INGRAM-RICHARDSON, INC.	10 & 11
INLAND STEEL COMPANY	20
INTERNATIONAL NICKEL COMPANY, INC., THE..	59
KERNS COMPANY, L. R.	51
LINK-BELT COMPANY	5
LIQUID PLASTICS DIVISION, FERRO CORPORATION	67
LITHIUM CORP. OF AMERICA, METALLOY CORP. DIV.	95
MACCO PRODUCTS COMPANY	7
MAHON COMPANY, THE R. C.	26
McDANIEL REFRACTORY PORCELAIN CO.	42
METALLOY CORPORATION	95
MICHIGAN STEEL CASTING COMPANY	90
MILLS ENGINEERING COMPANY	56
NEW MONARCH MACHINE & STAMPING CO.	46
NORTHWEST CHEMICAL CO.	18
OAKITE PRODUCTS, INC.	95
OWENS-CORNING FIBERGLAS CORPORATION ...	62
PACIFIC COAST BORAX CO.	43
PATTERSON FOUNDRY & MACHINE CO., THE	92
PEMCO CORPORATION	60 & 61
PENNSYLVANIA SALT MANUFACTURING CO.	13
RANSBURG ELECTRO-COATING CORP.	65
SPARKLER MANUFACTURING CO.	8
SUPERIOR SHEET STEEL DIVISION	53
TINNERMAN PRODUCTS, INC.	3rd COVER
TITANIUM ALLOY MFG. DIV., NATIONAL LEAD CO.	36
TITANIUM PIGMENT CORPORATION	19
UNION STEEL PRODUCTS CO.	6
UNITED STATES SAVINGS BONDS	68
U. S. STONWARE CO., THE	9
VITRO MANUFACTURING CO., THE	14
WATKINS CONTAINER MANUFACTURERS.....	ST-13
WIREBOUND BOX MANUFACTURERS ASSOC.	ST-9
YODER COMPANY, THE	64

"I saw your ad in finish"

August 26. He had been with Bellaire for 24 years.

NEMA HOUSEWARES SECTION

PLANS '52 GIFT CAMPAIGN

Plans for the continuation of the Electric Housewares Gift Campaign for 1952 have been approved by the Electric Housewares Section of the National Electrical Manufacturers Association.

The industry's long-range merchandising-promotion program, aimed at capturing a larger share of the year-around gift market, will continue under the direction of Ralf Shockey & Associates, Inc., New York City.

TEMCO NAMES SALES MANAGER

Frank Toler has been appointed sales manager of the gas appliance division of Temco, Inc., it was announced by W. Bratten Evans, Temco president.

Widely known in the appliance field, Toler was formerly connected with the Norge Division of Borg-Warner as district sales representative, and later as manager of water cooler sales. During the past year, he was engaged in his own business as a manufacturers' agent in Detroit.

GLIDDEN SENIOR V. P. RETIRES

Retirement of Clifton M. Kolb, senior vice president and secretary of The Glidden Company, was announced by Adrian D. Joyce, president.

"In his 29-year career with Glidden, Mr. Kolb has given distinguished and loyal service to his community and his company. He is retiring in accordance with the company's pension system, but he will remain a member of the board of directors," said Joyce.

Robert D. Horner, formerly an assistant to Kolb, has been elected secretary. John A. Peters, treasurer, has been elected vice president and will continue to serve as treasurer.

REFRIGERATION SAFETY

COMMITTEE SECRETARY DIES

Cyrus W. Miller, executive secretary of the Refrigeration Industry Safety Advisory Committee, died Au-

This new FREE booklet on Solvent Detergents

TELLS HOW two new types of Oakite-developed cleaners make it easier and cheaper for you to do many difficult metal-cleaning jobs. Here are some of the subjects covered in the booklet:

- Cleaning action of solvent detergents
- Types of Oakite solvent detergents
- Cleaning metal between processing operations
- Precleaning before painting or plating

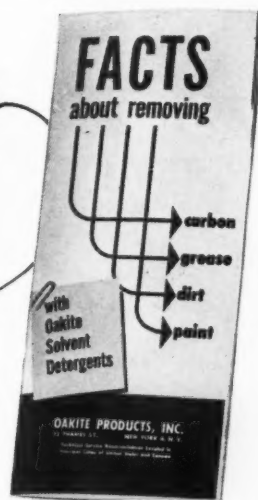
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CLEANING

DO YOU KNOW
THEIR 9 BIG
ADVANTAGES?
See page 7 ▶▶▶

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Providing temporary
protection against rust
How to use Oakite solvent
detergents:

- Spray-washing machine method
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A formula for better enameling ...

$$A + B + (-C) + (-D) = X$$

What does X equal?..If:

- A = Frit
- B = Lithium
- C = Firing Temperature
- D = Firing Time
- X = (?)

Frit + Lithium* + Lower Firing Temperature
+ Shorter Firing Time = X
What does X equal?

X = Better Enamels

Q. What makes X = Better Enamels?

A. LITHIUM—by METALLOY!

Q. E. D.



WRITE US about your enamel, glaze or glass problem. Let Metalloy's Ceramic Engineers solve your production equation. Send it c/o Dept. F I

*If it's Lithium . . .
It's Metalloy!



METALLOY CORP., Division
Rand Tower
Minneapolis 2, Minnesota

gust 13 at his home in North Tarryton, N. Y.

An authority on safe installation and operation of mechanical refrigeration systems, Miller, as executive secretary of RISAC, was consulted

on safety code problems throughout the country. He was largely responsible for the wide acceptance of uniform municipal and state safety codes for mechanical refrigeration.

STEEL KITCHEN CABINET MANUFACTURERS ASSOCIATION LAUNCHED AT CLEVELAND MEETING

THE Steel Kitchen Cabinet Manufacturers Association, Inc., was organized at an industry meeting held at the Cleveland Hotel, Cleveland, Ohio, September 12. The new organization, which has no connection with the Steel Kitchen Cabinet Institute, will conduct recognized association activities of benefit to the governmental departments in an emergency, to the purchasers of the

industry's products, and to those engaged in the steel kitchen cabinet industry.

Committees to implement the various activities of the association are being considered and will be announced in the near future. Headquarters of the new organization will be at 1006-1008 Engineers Building, Cleveland, Ohio.

President of the new Association

is M. M. Miller, president, Miller Metal Products, Inc., Baltimore, Maryland.

Vice president is F. F. Dugan, general sales manager, American Central Division, Avco Manufacturing Corp., Connersville, Indiana.

Executive secretary and treasurer is Arthur J. Tuscany, of the association management firm, Arthur J. Tuscany Organization, Cleveland.

The board of directors, together with the president and vice president, includes the following:

Thomas W. Hardy, Murray Corporation of America, Scranton, Pennsylvania; Harry S. Lawrence, Capitol Kitchens, Roselle, New Jersey; Robert A. MacNeille, St. Charles Manufacturing Co., St. Charles, Illinois; Charles A. Morrow, Mullins Manufacturing Corp., Warren, Ohio; C. S. Motter, Morton Manufacturing Co., Chicago, Illinois; and F. E. O'Connor, Geneva Modern Kitchens, Inc., Geneva, Illinois.

In commenting on the new organization, Arthur J. Tuscany, executive secretary and treasurer, stated:

"At the first industry meeting in February and a subsequent get-together in June, there was a strong feeling that a continuing national association functioning along the recognized lines of the many outstanding manufacturers' groups should be completed in the steel kitchen cabinet industry. The new organization, estimated to represent approximately 90 per cent of the industry capacity, is designed to give help to the government in any emergency which may be developing, the users of steel kitchen cabinets, as well as the manufacturers."

WESTINGHOUSE PRODUCES 4,000,000TH REFRIGERATOR

The 4,000,000th refrigerator recently rolled off the assembly lines at Westinghouse Electric Corporation's electric appliance division plant in Mansfield, Ohio.

George H. Meilinger, manager, household refrigeration department, stated that "current production of refrigerators is running about 25 per cent less than the similar period last year."

